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Albuquerque District Office
Rio Puerco Resource Area

April 1990

EL MALPAIS
NATIONAL CONSERVATION AREA
GENERAL MANAGEMENT PLAN
DRAFT

The Bureau of Land Management...
is responsible for the balanced management of the public lands and resources and their various values so that they are considered in a combination that will best serve the needs of the American people. Management is based upon the principles of multiple use and sustained yield, a combination of uses that takes into account the long-term needs of future generations for renewable and non-renewable resources. These resources include recreation, range, timber, minerals, watershed, fish and wildlife, wilderness, and natural, scenic, scientific, and cultural values.

BLM-NM-PT-90-001-4332

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
RIO PUERCO RESOURCE AREA
435 MONTANO N.E.
ALBUQUERQUE, NEW MEXICO 87107

1610 (017)

April 1990

Dear Reader:

Congress established the El Malpais National Conservation Area and National Monument near Grants, New Mexico with the passage of Public Law 100-225 on December 31, 1987. The National Conservation Area contains about 262,600 acres and is managed by the Bureau of Land Management. The National Monument contains about 114,000 acres and is managed by the National Park Service.

In addition to designating these areas, Congress provided some direction as to how they should be managed, and mandated that a General Management Plan (GMP) be written for each. Each agency has selected a planning team, and the teams have gathered as much information as possible, consulted with professionals from other government and non-government sources and with each other, held public meetings, solicited written and verbal comments, and talked with Native American groups.

With all this input in mind, each agency now written a Draft General Management Plan, which is ready for review and comment. This document is the draft plan and environmental assessment for the National Conservation Area.

The plans present the following:

* The condition of the land and its resources.

* The proposals for meeting the legislative mandates, enabling visitors to experience the significant features, and providing protection for the resources of the areas designated by Congress.

* The feasible alternatives for managing these areas.

* The impacts of implementing the proposal and the alternatives.

You will find both similarities and differences in the two General Management Plans. The differences occur because the Bureau of Land Management and the National Park Service have different missions and functions.

The Bureau of Land Management actively manages public land resources, including those of the National Conservation Area, to meet the full spectrum of public needs. This management is done in a way that ensures the resources will continue to be available predictably in the future. The Bureau of Land Management's challenge in the National Conservation Area is to provide for a multitude of uses (such as recreation, wildlife, wilderness, cultural values, and grazing) while preserving the values for which the conservation area was established. The BLM's General Management Plan is described in terms of resource-based management units.

The National Park Service promotes and regulates the use of national parks and monuments to conserve the scenery, the natural and historic objects, and the wildlife, and

provides for the enjoyment of these things in such a way that future generations can also enjoy them. The National Park Service's General Management Plan is presented in terms of visitor use areas.

The two plans are similar in that both agencies are concerned with protecting the resources of El Malpais area, both offer a "preferred" plan and an alternative for managing the land under agency jurisdiction, and both are committed to responding to Native American concerns for managing the land. Both plans contain sections on managing cultural resources, natural resources, wilderness, and developing visitor facilities.

Previous public involvement has been the basis for identifying the issues that are addressed in these GMPs. These plans, which are submitted for your review and comment, are the next important step in involving the public in the management of these two areas. We now need your written comments and ideas on these draft plans to formulate specific approaches to dealing with the issues previously identified.

Public meetings will also be held during the review period to allow for your comments. The first of these meetings will be held in Grants on April 18, 1990, at the Cibola County Convention Center in the Cibola Hall. An open house will be conducted between 5:00 and 7:00 p.m. Specific comments will be taken by both agencies at a public meeting from 7:00 to 8:00 p.m. A formal hearing on the suitability or non-suitability for wilderness of the Chain of Craters Wilderness Study Unit will be conducted between 8:00 and 9:00 p.m.

Albuquerque public meetings will be conducted on April 19, 1990, at the Albuquerque Convention Center in the Zuni-Acoma Room. These meetings will have the same formats and timeframes as the meetings in Grants.

A limited number of copies of the draft plan are still available from the Bureau of Land Management at the following address. This is also the address to which you should direct your written comments.

Bureau of Land Management
Al Abee, Area Manager
Rio Puerco Resource Area
435 Montano Road NE
Albuquerque, New Mexico 87107
(505) 761-4504

Sincerely,

Larry L. Woodard

Larry Woodard
BLM State Director,
New Mexico State Office

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DRAFT
EL MALPAIS
NATIONAL CONSERVATION AREA
GENERAL MANAGEMENT PLAN
AND
ENVIRONMENTAL ASSESSMENT

APRIL 1990

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT OFFICE
RIO PUERCO RESOURCE AREA

EL MALPAIS GENERAL MANAGEMENT PLAN
AND
ENVIRONMENTAL ASSESSMENT

TABLE OF CONTENTS

Page

PART 1

Chapter 1 - Introduction

Section 1 - Purpose of the Plan 1-1
Section 2 - Plan Monitoring and Revision Process. 1-1
Section 3 - Organization and Contents of This Document. . . 1-2
General Organization. 1-2
Contents of Specific Document Sections. 1-2
Section 4 - National Conservation Area Overview/ Affected Environment 1-4
Location. 1-4
Climate, Air Quality, and Water 1-4
The People. 1-5
The Land. 1-8
Section 5 - Understanding This GMP. 1-13
How BLUs Are Used in This GMP 1-13
The Planning Process Used to Develop This GMP . 1-14
Relationship Between Resource Issues and the BLUs 1-14
Regional Planning to Site Planning. 1-26

Chapter 2 - Management Summary

Section 1 - Introduction. 2-1
Section 2 - The El Malpais Legislation. 2-1
Section 3 - Existing Management 2-1
Management Guidance 2-1
Key Actions Completed and Initiated 2-2
Staffing. 2-3
Section 4 - Proposed Expansion of the NCA Boundary. 2-4
Section 5 - Public Involvement and Issues 2-7
Section 6 - BLM Goals for Managing the NCA. 2-7
Section 7 - The Proposed Plan and Alternative 2-8
Summary of Proposed Actions and Facilities (Preferred Alternative). 2-8
Summary of Low Change Alternative 2-15

Chapter 3 - Conservation Unit Management Plan

Section 1 - Introduction. 3-1
Section 2 - Unique Features of the Conservation Unit. . . . 3-1
Section 3 - Conservation Unit Management Program. 3-5
Introduction. 3-5
Recreation. 3-5
Wildlife Habitat. 3-40
Range Management. 3-46
Natural Resources 3-57
Cultural Resources. 3-61
Native American Issues. 3-66

Chapter 3, concluded

- Section 4 - Conservation Unit Environmental Assessment. . . 3-67
  - Introduction. 3-67
  - Environmental Consequences of the Preferred Alternative 3-67
  - Environmental Consequences of the Low Change Alternative. 3-71

Chapter 4 - Cebolla Wilderness Unit Management Plan

- Section 1 - Introduction. 4-1
  - Purpose of the Plan 4-1
  - Organization of the Plan. 4-1
- Section 2 - Wilderness Overview 4-2
  - Background and Location 4-2
  - Ownership and Boundary Description. 4-2
- Section 3 - Unique Features of the Cebolla Wilderness . . . 4-2
- Section 4 - Management Goals. 4-5
- Section 5 - Cebolla Wilderness Management Program 4-5
  - Introduction. 4-5
  - Naturalness 4-6
  - Recreation. 4-11
  - Range Management. 4-18
  - Wildlife Habitat. 4-26
  - Scientific Study. 4-29
  - Cultural Resources. 4-31
  - Native American Issues. 4-36
- Section 6 - Cebolla Wilderness Unit Environmental Assessment 4-37
  - Introduction. 4-37
  - Environmental Consequences of the Preferred Alternative. 4-37
  - Environmental Consequences of the Low Change Alternative 4-40

Chapter 5 - West Malpais Wilderness Unit Management Plan

- Section 1 - Introduction. 5-1
  - Purpose of the Plan 5-1
  - Organization of the Plan. 5-1
- Section 2 - Wilderness Overview 5-2
  - Background and Location 5-2
  - Ownership and Boundary Description. 5-2
- Section 3 - Unique Features of the West Malpais Wilderness. 5-2
- Section 4 - Management Goals. 5-5
- Section 5 - West Malpais Wilderness Management Program. . . 5-5
  - Introduction. 5-5
  - Naturalness 5-6
  - Recreation. 5-10
  - Range Management. 5-16
  - Wildlife Habitat. 5-22
  - Scientific Study. 5-25
  - Cultural Resources. 5-27
  - Native American Issues. 5-30

Chapter 5, concluded

Section 6 - West Malpais Wilderness Unit Environmental Assessment 5-31
Introduction. 5-31
Environmental Consequences of the Preferred Alternative. 5-31
Environmental Consequences of the Low Change Alternative 5-34

Chapter 6 - Chain of Craters Wilderness Analysis Report/ Environmental Assessment

Section 1 - General Description 6-1
Location. 6-1
Climate and Topography. 6-1
Land Status 6-1
Access. 6-1
Biophysical Land Units. 6-1
Description of the Issues, Proposed Action, and Alternatives 6-4
Section 2 - Existing Resources and Environment. 6-8
Geology 6-8
Water 6-9
Soils 6-9
Vegetation. 6-9
Wildlife. 6-11
Visual Resources. 6-12
Cultural Resources. 6-12
Native American Issues. 6-12
Air Quality 6-12
Section 3 - Existing and Potential Uses 6-12
Mineral Development 6-12
Watershed 6-13
Livestock Grazing 6-13
Forest Products 6-15
Recreation. 6-15
Wildlife. 6-15
Education and Research. 6-15
Native American Uses. 6-15
Cultural Resources. 6-16
Section 4 - Wilderness Criteria 6-16
Evaluation of Wilderness Values 6-16
Manageability 6-17
Section 5 - Alternatives and Impacts. 6-18
Introduction. 6-18
All Wilderness Alternative. 6-18
No Wilderness Alternative (Proposed Action) . . 6-20
Section 6 - Consultation and Coordination 6-21

Chapter 7 - Monitoring Plan (Deferred to the Final GMP)

Chapter 8 - Implementation Plan (Deferred to the Final GMP)

PART 2
Chapter 9 - Interpretation and Education Plan
Section 1 - Introduction. 9-1
Section 2 - General Goals 9-1
Section 3 - Current Situation 9-2
Section 4 - Elements of This Plan 9-3
Section 5 - Proposed Management Prescriptions and Actions . 9-4

Chapter 10 - Facility Development Plan
Section 1 - Introduction .10-1
Section 2 - Facility Development Guidelines. 10-1
Section 3 - Major Public Facilities. 10-1
Section 4 - Trail System .10-2
Section 5 - Proposed Management Prescriptions and Actions.10-3

Chapter 11 - Wildlife Resources Management Plan
Section 1 - Introduction .11-1
Section 2 - Current Situation. 11-1
Section 3 - Elements of This Plan. 11-2
Section 4 - Proposed Management Prescriptions and Actions.11-5

Chapter 12 - Natural Resources Management Plan
Section 1 - Introduction .12-1
Section 2 - Current Situation. 12-1
Section 3 - Management Prescriptions and Actions 12-4

Chapter 13 - Cultural Resources Management Plan
Section 1 - Introduction .13-1
Section 2 - Previous Research. 13-1
Section 3 - Cultural Resources of the El Malpais NCA . . .13-1
Section 4 - Specific Use Allocations 13-7
Section 5 - Cultural Resources Management Program. 13-9

TABLES

Table 1-1 Biophysical Land Units in the El Malpais National Conservation Area. 1-10
Table 1-2 Natural Capabilities and Limitations of the BLUs for Recreation Management 1-15
Table 1-3 Natural Capabilities and Limitations of the BLUs for Wilderness Management 1-18
Table 1-4 Natural Capabilities and Limitations of the BLUs for Wildlife Habitat Management 1-22
Table 1-5 Natural Capabilities and Limitations of the BLUs for Range Management. 1-24
Table 1-6 Natural Capabilities and Limitations of the BLUs for Visual Resources Management 1-26
Table 2-1 Key Actions Completed and Initiated in the El Malpais NCA. 2-2
Table 2-2 Current Authorized BLM Staff at El Malpais Information Center, Grants, NM. 2-3
Table 2-3 BLM Staffing Requirements Under the Preferred Alternative 2-3

Tables, continued

Table 2-4 Summary of BLM Proposed Actions in the El Malpais NCA. 2-9
Table 3-1 Biophysical Land Units in the Conservation Unit 3-3
Table 3-2 Recreation Opportunities in the Conservation Unit 3-8
Table 3-3 Management Prescriptions and Actions for Kiosks. 3-18
Table 3-4 Management Prescriptions and Actions for Ranger Station. 3-20
Table 3-5 Management Prescriptions and Actions for La Ventana Natural Arch 3-23
Table 3-6 Management Prescriptions and Actions for the South Big Narrows 3-24
Table 3-7 Management Prescriptions and Actions for the Dittert Site. 3-26
Table 3-8 Management Prescriptions and Actions for Mertz Ranch/Field Learning Center 3-27
Table 3-9 Management Prescriptions and Actions for the Multiagency Center. 3-29
Table 3-10 General Administrative and Management Prescriptions and Actions Directed from the Grants Administrative Site. 3-30
Table 3-11 Management Prescriptions and Actions for Trails. 3-36
Table 3-12 Management Prescriptions and Actions for the Roe Homestead 3-38
Table 3-13 Management Prescriptions and Actions for Watchable Wildlife. 3-39
Table 3-14 Management Prescriptions and Actions for Special Use Areas 3-44
Table 3-15 Management Prescriptions and Actions for Species Management. 3-45
Table 3-16 Ecological and Vegetative Information for for Allotments Overlapping the Conservation Unit 3-46
Table 3-17 Grazing Allotments Partially Located in the Conservation Unit 3-52
Table 3-18 Management Prescriptions and Actions for Forage and Desired Plant Communities. 3-56
Table 3-19 Management Prescriptions and Actions for Range Improvements. 3-56
Table 3-20 Management Prescriptions and Actions for Water Quality and Availability. 3-59
Table 3-21 Management Prescriptions and Actions for Natural Features. 3-60
Table 3-22 Management Prescriptions and Actions for Visual Resources. 3-60
Table 3-23 Percentage of Class III Archeological Survey in the Conservation Unit. 3-61
Table 3-24 Management Prescriptions and Actions for Vandalism and Surface Collection. 3-62

Tables, continued

Table 3-25 Management Prescriptions and Actions for Natural Deterioration 3-64
Table 3-26 Management Prescriptions and Actions for BLM-Authorized Actions. 3-65
Table 3-27 Management Prescriptions and Actions for Information and Education 3-65
Table 3-28 Management Prescriptions and Actions for Native American Concerns. 3-67
Table 4-1 Biophysical Land Units in the Cebolla Wilderness Unit 4-4
Table 4-2 Management Prescriptions and Actions for Restoration 4-9
Table 4-3a Management Prescriptions and Actions for Resource Protection 4-10
Table 4-3b Recreation Opportunities in the Cebolla Wilderness Unit 4-11
Table 4-4 Management Prescriptions and Actions for Visitor Management. 4-16
Table 4-5 Management Prescriptions and Actions for Interpretation and Public Education . . . 4-18
Table 4-6 Grazing Allotments Partially Located in the Cebolla Wilderness. 4-19
Table 4-7 Ecological and Vegetative Information for Allotments Overlapping the Cebolla Wilderness Unit 4-19
Table 4-8 Management Prescriptions and Actions for Forage and Desired Plant Communities. . . 4-25
Table 4-9 Management Prescriptions and Actions for Range Improvements. 4-25
Table 4-10 Management Prescriptions and Actions for Special Use Areas 4-27
Table 4-11 Management Prescriptions and Actions for Regulated Species Management. 4-28
Table 4-12 Management Prescriptions and Actions for Scientific Research and Data Collection . 4-30
Table 4-13 Management Prescriptions and Actions for Vandalism and Surface Collection. 4-32
Table 4-14 Management Prescriptions and Actions for Natural Deterioration 4-34
Table 4-15 Management Prescriptions and Actions for BLM Authorized Actions. 4-35
Table 4-16 Management Prescriptions and Actions for Public Information and Education. 4-35
Table 4-17 Management Prescriptions and Actions for Native American Concerns. 4-37
Table 5-1 Biophysical Land Units in the West Malpais Wilderness Unit. 5-4
Table 5-2 Management Prescriptions and Actions for Restoration 5-8
Table 5-3 Management Prescriptions and Actions for Resource Protection 5-9
Table 5-4 Recreation Opportunities in the West Malpais Wilderness Unit. 5-10

Tables, continued

Table 5-5 Management Prescriptions and Actions for Visitor Management. 5-15
Table 5-6 Management Prescriptions and Actions for Interpretation and Public Education . . . 5-16
Table 5-7 Grazing Allotments Partially Located in the West Malpais Wilderness 5-17
Table 5-9 Management Prescriptions and Actions for Forage/Desired Plant Communities. 5-21
Table 5-10 Management Prescriptions and Actions for Range Improvements. 5-21
Table 5-11 Management Prescriptions and Actions for Special Use Areas 5-24
Table 5-12 Management Prescriptions and Actions for Regulated Species Management. 5-24
Table 5-13 Management Prescriptions and Actions for Scientific Research and Data Collection . 5-26
Table 5-14 Management Prescriptions and Actions for Vandalism and Surface Collection. 5-28
Table 5-15 Management Prescriptions and Actions for Natural Deterioration 5-28
Table 5-16 Management Prescriptions and Actions for BLM Authorized Actions. 5-29
Table 5-17 Management Prescriptions and Actions for Public Interpretation and Education . . . 5-29
Table 5-18 Management Prescriptions and Actions for Native American Concerns. 5-31
Table 6-1 Biophysical Land Units in the Chain of Craters Wilderness Study Unit 6-4
Table 6-2 Chain of Craters - Summary of Scoping. 6-5
Table 6-3 Description of the Proposed Action and Alternative 6-6
Table 6-4 Recreation Opportunities in the Chain of Craters Wilderness Study Unit 6-8
Table 6-5 Assessment of Mineral Potential in the Chain of Craters Unit. 6-13
Table 9-1 Summary of Management Prescriptions and Actions for Interpretation and Public Education . . . 9-4
Table 10-1 Summary of Management Prescriptions and Actions for Facility Development. 10-3
Table 11-1 Completed Wildlife Projects, El Malpais Habitat Management Plan 11-3
Table 11-2 Summary of Management Prescriptions and Actions for Wildlife Management 11-5
Table 12-1 Summary of Management Prescriptions and Actions for Natural Resources 12-4
Table 13-1 Distribution of Class III Cultural Resources Survey Within Units and Subunits of the NCA .13-4
Table 13-2 Archeological Periods in the El Malpais NCA. .13-5
Table 13-3 Management Categories for Cultural Resources .13-7
Table 13-4 Management Prescriptions and Actions for Cultural Resources. 13-15
Table D-1 BLM Alternative Workbook Summary D-5

Tables, concluded

Table D-6 Summary of Written Comments. D-6
Table E-1 El Malpais Vegetative Classes. E-5
Table E-2 El Malpais Soil Groupings. E-7
Table F-1 Setting Opportunity. F-2

MAPS

Map 1-1 El Malpais National Conservation Area and National Monument 1-3
Map 1-2 Traditional Tribal Use Areas. 1-7
Map 1-3 Relative Density of Anasazi Sites Based on Class II Inventory 1-9
Map 2-1 Proposed Expansions of the El Malpais NCA Boundary for Resource Protection and Facility Development 2-5
Map 2-2 Proposed BLM Developments in the El Malpais NCA . 2-8
Map 3-1 Conservation Unit 3-2
Map 3-2 Recreation Opportunity Spectrum in the Conservation Unit 3-7
Map 3-3 Proposed BLM/NPS Development Along NM 117 Corridor. 3-10
Map 3-4 Proposed BLM/NPS Development Along NM 53/CR 42 Corridor 3-12
Map 3-5 Proposed BLM Treadway for the Continental Divide National Scenic Trail 3-33
Map 3-6 Areas Appropriate for Development of Additional Wildlife Waters in the Conservation Unit. 3-42
Map 3-7 Grazing Allotments Overlapping the Conservation Unit in Relationship to Biophysical Land Units. 3-51
Map 3-8 Range Improvements in the Conservation Unit . . . 3-53
Map 4-1 Cebolla Wilderness Unit 4-3
Map 4-2 Recreation Opportunity Spectrum in the Cebolla Wilderness Unit. 4-12
Map 4-3 Wilderness Areas Within 100 Miles of the NCA Wilderness Areas 4-14
Map 4-4 Grazing Allotments Overlapping the Cebolla Wilderness Unit in Relationship to Biophysical Land Units. 4-21
Map 4-5 Range Improvements in the Cebolla Wilderness Unit. 4-23
Map 5-1 West Malpais Wilderness Unit. 5-3
Map 5-2 Recreation Opportunity Spectrum in the West Malpais Wilderness Unit 5-11
Map 5-3 Wilderness Areas Within 100 Miles of the NCA Wilderness Areas 5-13
Map 5-4 Grazing Allotments Overlapping the West Malpais Wilderness Unit in Relationship to Biophysical Land Units. 5-18
Map 5-5 Range Improvements in the West Malpais Wilderness Unit 5-19

Maps, concluded

Map 6-1 Chain of Craters Wilderness Unit. 6-2
Map 6-2 Chain of Craters Wilderness Study Unit, Land Status. 6-3
Map 6-3 Recreation Opportunity Spectrum in the Chain of Craters Wilderness Study Unit. . 6-7
Map 6-4 Soil Groupings in the Chain of Craters Wilderness Study Unit. 6-10
Map 6-5 Range Improvements in the Chain of Craters Wilderness Study Unit. 6-14
Map 13-1 Cultural Resources Inventory in the El Malpais Area 13-2
Map 13-2 Distribution of Class III Cultural Resources Survey Within Various Subunits of the NCA. . . .13-3
Map B-1 Private Inholdings in NCA B-3
Map B-2 Private Minerals in NCA B-4
Map B-3 El Malpais National Conservation Area B-6
Map C-1 Alternate Routes for the Continental Divide National Scenic Trail (as They Relate to Severe Soils and Cultural Site Density). C-4
Map C-2 Continental Divide Nationa Scenic Trail (Connection with BLM Socorro Resource Area) . . C-5

FIGURES

Figure 1-1 Uses of BLUs for Regional and Site Planning. . 1-27
Figure 3-1 North Orientation Kiosk. 3-16
Figure 3-2 South Orientation Kiosk. 3-17
Figure 3-3 Ranger Station Development Plan. 3-19
Figure 3-4 La Ventana Development Plan. 3-22
Figure 3-5 South Big Narrows Development Plan 3-25
Figure 3-6 Typical Trailhead Facility 3-34
Figure 3-7 Typical Trailhead Facility to Accomodate Horseback Riders. 3-35
Figure 13-1 Cultural Resources Found in the El Malpais Class II Survey Grouped by Time Periods . . .13-4
Figure 13-2 Petroglyphs (LA 10884) in the Cebolla Wilderness Unit. 13-10
Figure E-1 Boolean Derived BLU Core Data. E-8

APPENDICES

Appendix A Highlights of the El Malpais Legislation . . . A-1
Appendix B Summary of Land Protection Plan. B-1
Appendix C Amendments to the Rio Puerco Resource Management Plan C-1
Appendix D Summary of Public Input to Date. D-1
Appendix E Geographic Technologies and Biophysical Land Unit Methodology E-1
Appendix F Recreation Opportunity Spectrum. F-1
Appendix G Species Known or Likely to Occur in El Malpais National Conservation Area. . . G-1

Appendices, concluded

Appendix H Special Status Species Potentially Occurring in El Malpais National Conservation Area. . . H-1
Appendix I Rio Puerco Resource Area Allotment Categorization Criteria I-1
Appendix J Limits of Acceptable Change (LAC) Monitoring System--Indicators Monitor El Malpais NCA Conditions J-1
Appendix K Partial Checklist of Vegetation of El Malpais NCA K-1
Appendix L Explanation of Terms Used to Describe Visual Absorption Capability. L-1
Glossary. GL-1
References. R-1
List of Preparers. . . . . Following References

PART 1

The land. The people.
They are in relation to each other.
We are in a family with each other.
The land has worked with us.
And the people have worked with it.
This is true:
Working for the land
and the people--it means life
and its continuity.
Working not just for the people,
but for the land too.
We are not alone in our life;
we cannot expect to be.
The land has given us our life,
and we must give life back to it.

The land has worked for us
to give us life--
breathe and drink and eat from it
gratefully--
and we must work for it
to give it life. . . .

By working in this manner,
for the sake of the land and people
to be in vital relation
with each other,
we will have life,
and it will continue.

We have been told many things,
but we know this to be true:
the land and the people.

--From "We Have Been Told Many Things
But We Know This To Be True,"
by Simon Ortiz, Acoma Pueblo

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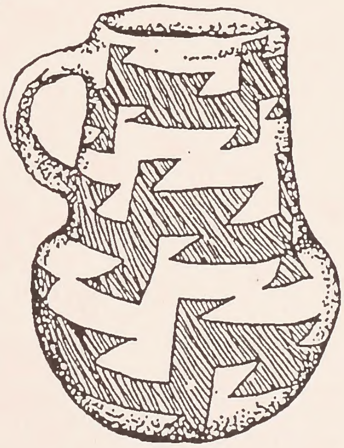


CHAPTER 1

Introduction

Chapter 1
Introduction

Section 1
Purpose of the Plan

The El Malpais National Conservation Area (NCA) near Grants, New Mexico, was established on December 31, 1987, with the signing of Public Law 100-225 (referred to in this document as "the El Malpais legislation" or "PL 100-225"; refer to Appendix A for a summary). The NCA, managed by the Bureau of Land Management, covers 262,600 acres.

The legislation also authorized the creation of the Masau Trail, and established the El Malpais National Monument, composed of 114,000 acres. These latter two entities are managed by the National Park Service (NPS).

The purpose of an NCA is to protect and conserve nationally important natural and cultural resources while allowing compatible uses. Resource conservation, coupled with compatible uses, is the mainstay of management practices within an NCA. Each NCA is established by Congress through a specific act tailored to an area's nationally important natural and cultural resources. The El Malpais NCA is the fourth of five NCAs designated by Congress. NCA designation exemplifies the BLM's long-term commitment to the management of special areas.

The El Malpais NCA was established to protect unique and nationally significant resources for the benefit and enjoyment of present and future generations. These resources include the geological, archeological, ecological, cultural, scenic, scientific, and wilderness features that surround lava flows near Grants, New Mexico.

The El Malpais legislation requires that separate General Management Plans (GMPs) be developed for the NCA and the National Monument. The scope of each GMP is confined to the subject of how the NCA or National Monument will be managed consistent with the legislation.

This GMP describes how the NCA will be managed both now and in the future. It outlines plans for visitor use, facility development, and management of the area's natural resources. The GMP also displays the results of a study of wilderness potential for one portion of the NCA.

Section 2
Plan Monitoring and Revision Processes

This GMP will direct the management of the NCA for the next 10 years. Resource changes in the NCA will be monitored using the Limits of Acceptable Change system (refer to Appendix J). The objective of this system is to collect specific information on natural resources that will realistically indicate any changes in resource condition, over time.

This plan will be used throughout the NCA to manage and monitor all of the NCA's natural and cultural resources. Monitoring procedures will indicate the need for plan revision. At a minimum, such an assessment will take place annually. Monitoring results will then be integrated into the GMP management framework annually. This will help ensure a plan that is current and compatible with the shifting physical, social, and political variables influencing management of the NCA.

The annual assessment of resource conditions in the NCA will be reported along with any recommended amendments to the GMP. This report will be sent to all interested publics. Any GMP amendments that include only information updates, minor revisions or minor corrections will be written into the working document, dated, and initialed.

Section 3
Organization and Contents of This Document

GENERAL ORGANIZATION

The contents of this document are organized from the general to the specific, keeping in mind the multiple interests of its readers. This arrangement allows each reader to select the level of detail most useful to her or his specific interest.

Chapters have been grouped into Parts I and II. Part I of the GMP contains the most general (summary) chapters, 1 and 2, as well as chapters that contain management plans for each of the four management units in the NCA. These are the Conservation Unit, the Cebolla Wilderness Unit, the West Malpais Wilderness Unit, and the Chain of Craters Wilderness Study Unit (refer to Map 1-1). Collectively, these four chapters outline all management proposals being made for the NCA.

Each of these units has specific management needs dictated by the El Malpais legislation. Two units, the Cebolla and the West Malpais, are designated as wilderness and are to be managed as part of the National Wilderness Preservation System. The Chain of Craters Unit is being studied for potential wilderness designation, and a recommendation on its wilderness suitability will be made to Congress.

The remaining acreage of the NCA is contained within the Conservation Unit, which is composed of eight separate non-wilderness tracts (subunits) scattered throughout the NCA. These subunits include, in the northern half of the NCA (from east to west), the Spur, the Neck, the Cerritos de Jaspe, and the Continental Divide. In the southern half of the NCA, from east to west, are the Brazo, the Breaks, and the Cerro Brillante. Though most discussions in the GMP refer to the larger management units, including the Conservation Unit, the subunits such as Cerritos de Jaspe are also referred to when needed to clarify a discussion.

Part II of the GMP contains chapters that discuss and summarize management plans specific to five critical NCA issues. These plans are required by the El Malpais legislation and public comments, and include an interpretation and education plan (Chapter 9), a facility development plan (Chapter 10), a wildlife resources management plan (Chapter 10), a natural resources management plan (Chapter 12), and a cultural resources management plan (Chapter 13).

Each plan summarizes the management proposals for all the NCA, for one single issue. Each also includes some additional background information, as well as information on the management situation, assumptions, and policy pertinent to each resource issue. Within each plan are tables that list specific management prescriptions and actions and the natural and human environment they could affect.

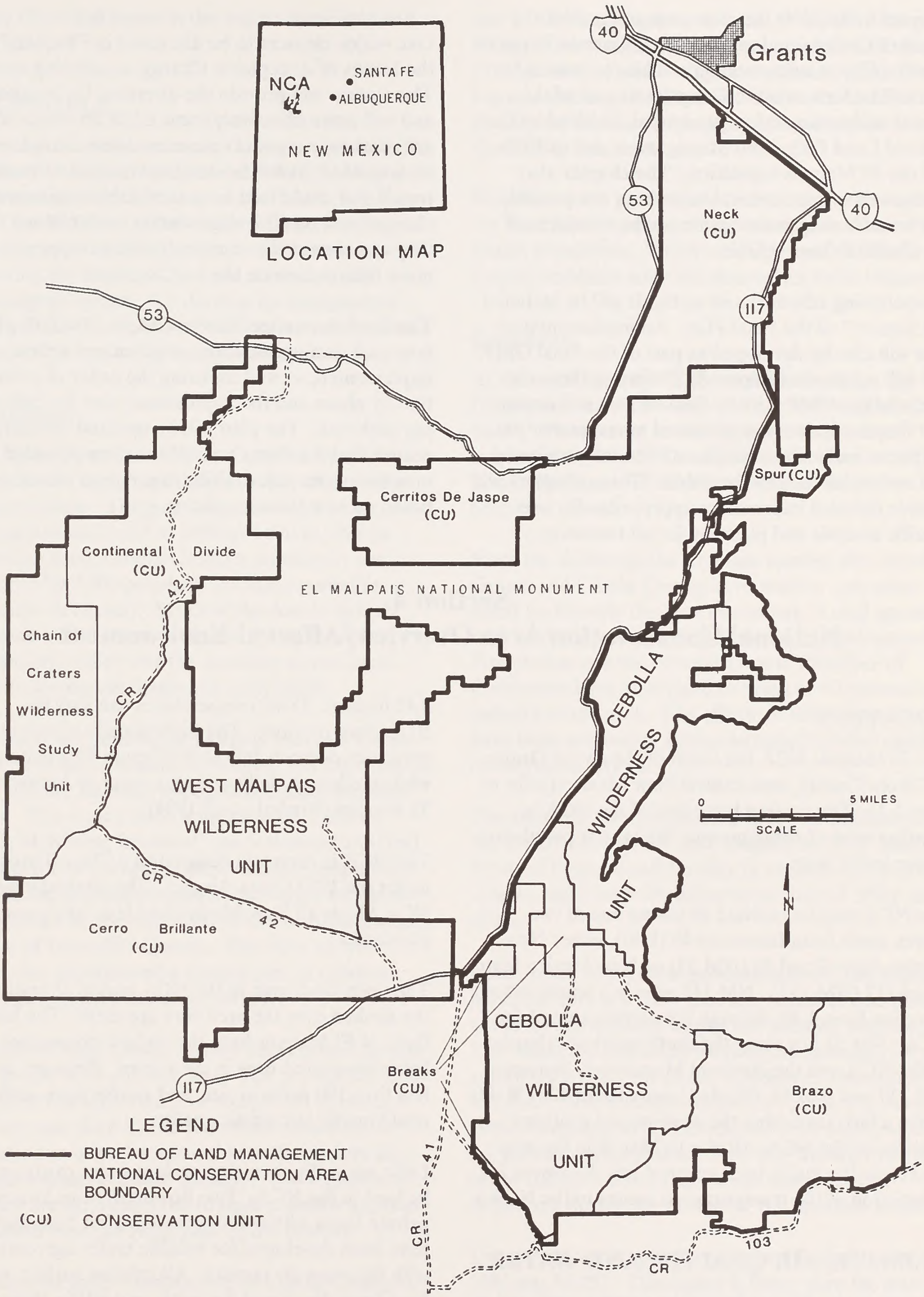
CONTENTS OF SPECIFIC DOCUMENT SECTIONS

Chapter 1 includes a general introduction to the purpose of the GMP. Also presented is a description of the affected environment in the NCA, including the land and the people.

Chapter 2 is a management summary for the NCA. It identifies legislative mandates, existing management, existing and projected staffing and budget needs for the NCA, and the results of public involvement. This information has been used to form alternatives and goals for managing the NCA. The chapter also contains a summary of management actions for the proposed plan and an alternative.

Chapters 3 through 5 are individual management plans for the Conservation Unit, the Cebolla Wilderness Unit, and the West Malpais Wilderness Unit. These chapters contain descriptions of the units, including unique features and existing resources. Management prescriptions and proposed actions are presented, along with assessments of the impacts of these actions and an alternative set of actions on the environment of the units.

Chapter 6, written for the Chain of Craters Wilderness Study Unit, is organized differently than Chapters 3 through 5 and contains different information because it serves a different purpose. While the Cebolla and West Malpais units of the NCA have been formally designated as wilderness by the El Malpais legislation, the Chain of Craters Unit is still under study to determine its suitability for wilderness designation.



MAP 1-1
EL MALPAIS NATIONAL CONSERVATION AREA AND NATIONAL MONUMENT

Chapter 6 considers the resources and uses of the Chain of Craters, and makes a recommendation as to its suitability or non-suitability. This recommendation will be forwarded to Congress as part of the formal wilderness review process, as required by the Federal Land Policy and Management Act of 1976 and the El Malpais legislation. The chapter also assesses the environmental impacts of two possible courses of management action on the resources of the Chain of Craters Unit.

A monitoring schedule and methods will be included as Chapter 7 of the Final Plan. An implementation plan will also be developed as part of the Final GMP, and will appear as Chapter 8. Deferring these elements of the GMP until its final version will ensure that they are built upon preferred management prescriptions and actions that have been fully reviewed and commented on by the public. These chapters will include detailed information appropriate for site-specific analysis and planning for all resources.

One major element to be discussed in Chapter 7 is the Limits of Acceptable Change monitoring system. This system will provide the direction for monitoring, and will more effectively focus BLM attention and activities on areas and resources where such emphasis is needed. It will be designed to alert managers to trends that could lead to unacceptable environmental changes and possible degradation early enough that they can correct the situation (refer to Appendix J for more information on the LAC system).

The Implementation Plan in Chapter 8 will display how each management prescription and action will be implemented, as well as listing the order of completion by phase and the approximate cost for completing each task. The plan will be updated annually to ensure that it reflects new information provided by monitoring, as well as shifts in program direction based on new laws or policies.

Section 4
National Conservation Area Overview/Affected Environment

LOCATION

The El Malpais NCA lies south of the city of Grants in Cibola County, west-central New Mexico (refer to Map 1-1). The eastern boundary of the NCA is 57 miles west of Albuquerque, the largest population center in the state.

The NCA may be reached by taking one of two routes south from Interstate 40 (I-40), either New Mexico State Road 53 (NM 53) or New Mexico State Road 117 (NM 117). NM 117 runs in a southwesterly direction from I-40, through the eastern side of the NCA. NM 53 lies along the north-northwest border of the NCA and the National Monument. Between NM 117 and NM 53, Cibola County Road 42 (CR 42) forms a link, traversing the western and southern portions of the NCA. (Refer to Map B in the map pocket on the inside back cover of this document for a depiction of the transportation routes in the NCA.)

CLIMATE, AIR QUALITY, AND WATER

Climate in the NCA is hot in the summer and cool in the winter. Precipitation averages 12 inches annually, with August being the wettest month (average 2.5 inches) and April or May the driest (0.35 to 0.42 inches). Daily temperatures can vary by 50 degrees or more. The highest daily average temperatures occur in July at 70 degrees Fahrenheit, while the lowest daily averages occur in January at 32 degrees (Roybal, et al. 1984).

The NCA is currently designated a Class II area under the 1977 Clean Air Act. The airshed over the NCA Meets all New Mexico and federal air quality standards.

The open landscape in the NCA makes alteration of the airshed over the area very apparent. The lava flows of El Malpais have the highest occurrence of lightning-started fires in the region. Fires are usually less than 100 acres in size, and smoke from such fires could briefly impact air quality.

Little naturally occurring surface water exists on public land in the NCA. Two flowing springs located on private lands within Conservation Unit boundaries have been developed for wildlife under agreements with the property owners. All existing surface waters have been developed for cattle or wildlife; these have not been tested for public use. Windmills have been constructed by allottees for range management. The quality of ground water in the region is variable and uncertain.

THE PEOPLE

Past and present human use is an important theme in both the El Malpais legislation and the BLM's proposed management of this area. In developing this GMP, the BLM has given consideration to accommodating traditional and projected human uses, improving the local and regional economy, and encouraging tourism. To develop its management prescriptions, the BLM used socioeconomic information provided by the National Park Service.

Population

The City of Grants and Cibola County have each experienced a significant decline in population over the past decade. The population of Grants has decreased from 11,439 in 1980 to 8,520 in 1986 (a 26-percent loss); Cibola County's population has decreased by 7,300 people in the same period (a 24-percent decrease). Much of this loss is directly attributed to the sharp decline in the demand for uranium ore, which was the mainstay of the local economy during the 1960s and early 1970s.

The region surrounding El Malpais National Conservation Area and National Monument has experienced a 13.7 percent increase in population since the 1980 census. This region (which includes Bernalillo, Cibola, McKinley, Sandoval, and Valencia Counties) accounts for 44 percent of New Mexico's population. Much of the population gain in the region (about 9.4 percent) can be attributed to the city of Albuquerque, the seat of Bernalillo County. The State of New Mexico has experienced a similar gain in residents (13.5 percent) over the same period.

It is believed that Cibola County has reached the end of its period of population loss. The population of the county has stabilized and is expected to increase by nearly one-third by the year 2000, returning the population to a level comparable to that before the downturn in the uranium industry. The region and the state are both expected to realize similar gains in population over the remainder of the century.

Although the racial composition of Cibola County is primarily Anglo American, many Native Americans also reside in the area. The pueblos of Acoma and Laguna are both within the county. With a population of about 4,200, the Pueblo of Acoma lies to the east of and is contiguous with the NCA. The Ramah Navajo Reservation, which has a population of about 2,000, is west of and contiguous with the NCA. The Laguna and Zuni Indian reservations are each within 40 miles of El Malpais, Laguna being due east and Zuni being due west.

Hispanics are a predominant ethnic group throughout New Mexico, accounting for over one-third of the state's population. Thirty-seven percent of Cibola County residents consider themselves to be Hispanic.

Economy

At the southern edge of the uranium belt, the city of Grants was once known as the "uranium capital of the world." However, a severe drop in the uranium market in the late 1970s caused a loss of over 4,000 jobs in the area. All uranium mines in the region have now closed.

Since the decline in the uranium market, the city of Grants and Cibola County have made a concerted effort to diversify the area's economy. Local agencies such as the Greater Grants Industrial Development Foundation and the Greater Grants Chamber of Commerce have attempted to bring new business and industry to the area. The efforts of these agencies have been successful, having attracted several small industries to Grants.

The state has also contributed to the revitalization of the area. Recently, the state located the New Mexico Western Correctional Facility (a women's prison) at Grants, and a highway department district office near Milan.

Local, state, and federal governments are the principal employers in Cibola County, with over one-third of the nonagricultural waged and salaried workforce. The wholesale and retail trade sector accounts for an additional 23 percent of the workforce. Unemployment in Cibola County totaled 13.4 percent in June of 1988 (compared to 8.7 percent for New Mexico during the same time period); however, unemployment in the county is down from levels that exceeded 20 percent during the decline of the uranium market.

The average per capita income for Cibola County in 1986 was $7,253. This figure is lower than the state average ($11,435) and the five-county region average ($12,236). Average per capita incomes for other individual counties in the five-county region include:

Bernalillo ($13,472), McKinley ($6,960), Sandoval ($11,082), and Valencia ($10,436).

The retail trade sector contributed the largest share of the total gross receipts for Cibola County in 1987 (over $83 million). Total gross receipts for Cibola County in 1987 exceeded $164 million. (This figure does not include gross agricultural receipts, which are not yet available for the county for 1987. However, agricultural cash receipts for Cibola County in 1986 were $8 million, most of which was attributable to livestock production.)

Tourism is an integral component of Cibola County's economy. In 1986, 437 individuals were employed by lodging or eating/drinking establishments in the county. Gross receipts of hotels, motels, trailer parks, and other lodging places totaled over $3 million in 1987. Gross receipts for eating and drinking places totaled over $10 million during the same period. The City of Grants collected almost $86,000 in lodger tax receipts during its fiscal year 1986-87.

Native American Issues

American Indian use of the NCA began over 10,000 years ago, and continues to the present day. At least four American Indian tribes have close ties to El Malpais--the Navajo Nation and the Pueblos of Acoma, Laguna, and Zuni. All four include at least a portion of the NCA in the area claimed as aboriginal territory (refer to Map 1-2). The current political boundaries of the NCA include the Ramah Navajo Reservation on the west and the Acoma Reservation on the east.

Recognizing that Indian people have used the NCA in the past, the El Malpais legislation guarantees Native Americans access for traditional cultural and religious purposes (consistent with the American Indian Religious Freedom Act and the Wilderness Act). The legislation further provides that specific portions of the NCA can be temporarily closed to protect the privacy of Native American religious activities.

El Malpais is a cultural landscape, used by local American Indian groups in ways that define and perpetuate their culture and traditions. The uses these groups have made of the NCA, including subsistence or economic uses as well as explicitly religious activities, are primarily tied to the concept of the sacredness of nature. Even though Indian people believe land resources are there to be used, they believe that use should be accompanied by reverence and proper respect for the spiritual power of the land.

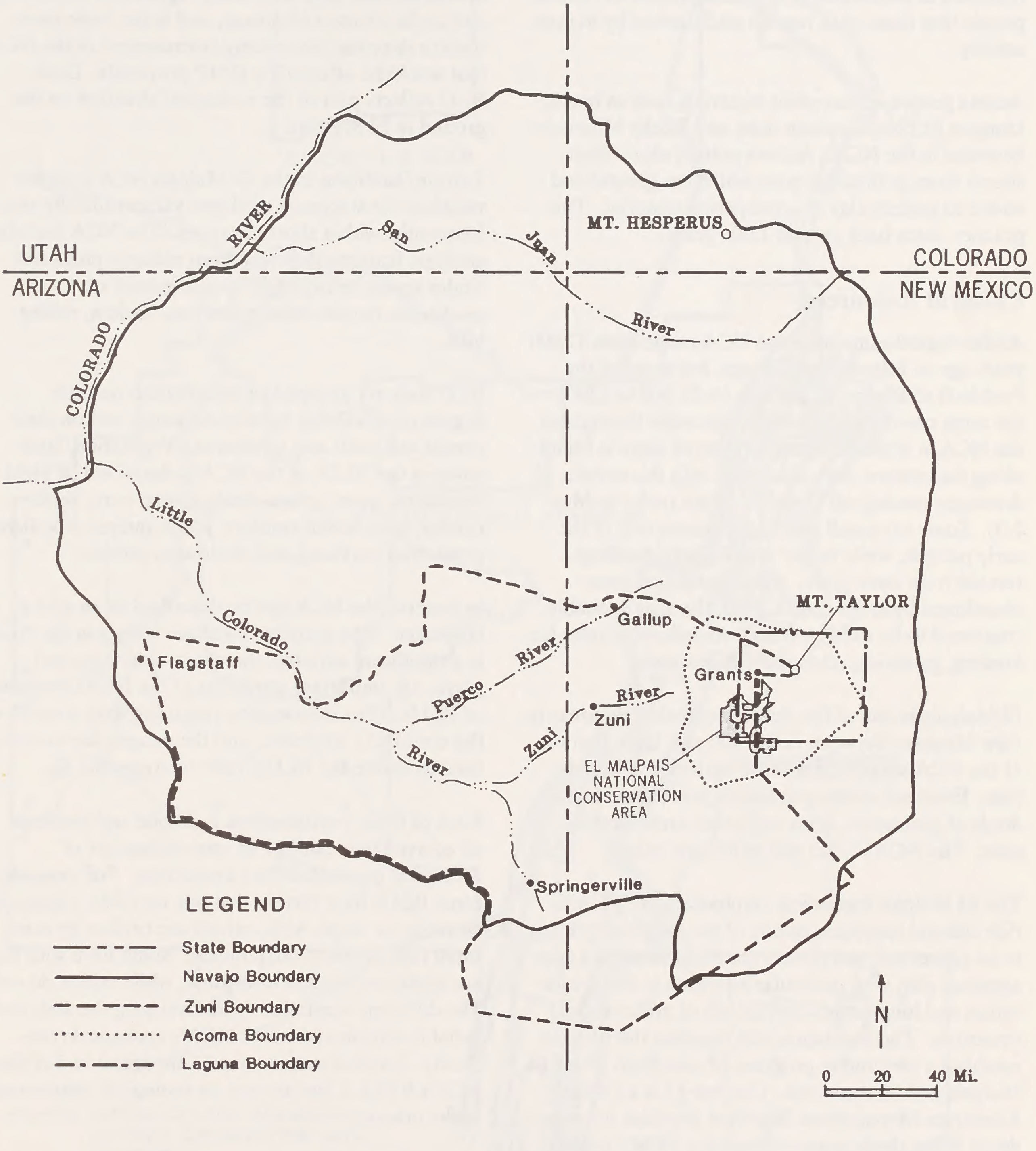
Although all of El Malpais, indeed the universe, has this sacred character, certain points are more important than others. This may be because they are mentioned in origin stories, because they serve as symbols for events that took place in mythological time, or because they are places where spiritual beings can be contacted.

General categories of places important to Navajo people include places important in mythology, places of spiritual danger, shrines, and gathering areas. Places important to Pueblo people include boundary points, places related to mythology, shrines, ancestral villages, pilgrimage trails, and gathering areas.

Pueblo and Navajo people are reluctant to divulge the location of sacred places or discuss traditional cultural and religious practices in any detail. Furthermore, knowledge of many important places may be held by only a handful of people in a pueblo or tribe. For these reasons, many specific places and practices pertaining to El Malpais are omitted in this discussion. This fact makes continued consultation and coordination with the concerned American Indian groups imperative.

The story of the origin of El Malpais' recent lava flows is told in the Navajo curing ceremony, Monsterway. The lava flows are the hardened blood of Yeitso, the chief of the enemy Yei, who was killed by the Hero Twins near Mount Taylor. Although most of the recent lava flows are within the El Malpais National Monument, portions of the "black rock area" in the NCA are important to Navajo people. Navajo shrines and gathering areas exist within the NCA. Sweat lodge sites are known in the NCA, and other types of places to be avoided may also be present.

For Acomas, the abode of Kaubat, the spiritual being responsible for the recent lava flows, is inside or near the NCA. Acoma people maintain shrines within the NCA. Various locations such as high points, water sources, and caves are used as prayer sites. Acoma and Laguna pilgrimage routes to important shrines in western New Mexico and eastern Arizona pass through the NCA. Specific shrines and offering points along the trails are also considered important.



MAP 1-2
TRADITIONAL TRIBAL USE AREAS

The numerous Anasazi habitation sites within the NCA are recognized by Acoma people as ancestral villages. Burials associated with these sites are regarded as ancestors. It is very important to Acoma people that these sites remain undisturbed by human activity.

Acoma people collect plant materials such as herbs, Douglas fir boughs, pinon nuts, and Rocky Mountain beeweed in the NCA. Acoma potters also collect sherds from prehistoric pots, which are ground and added to pottery clay as a tempering material. This practice dates back at least 1,000 years.

Cultural Resources

Archeological remains in the NCA range from 12,000 years ago to historic times in age, but those of the Pueblo II to Pueblo III periods (A.D. 900 to 1300) are most common. Although sites occur throughout the NCA, a dramatic concentration of them is found along the eastern side, associated with the mouths of drainages coming off Cebollita Mesa (refer to Map 1-3). Some are small pueblos characteristic of the early periods, while larger multi-family dwellings remain from later years. After residences were abandoned by around A.D. 1400, the area probably continued to be used by Native American peoples for hunting, gathering, and religious purposes.

El Malpais is one of the richest archeological areas in New Mexico. Between A.D. 1000 and 1350, portions of the NCA supported a dense agricultural population. Evidence of this population is reflected in hundreds of prehistoric ruins and other archeological sites. The NCA is also rich in historic values.

The El Malpais legislation emphasizes the NCA's rich cultural resources as one of the important values to be preserved, and directs the BLM to write a management plan with particular attention to the preservation and long-term scientific use of archeological resources. The legislation also requires the BLM to establish a continuing program of education about El Malpais and its resources. Chapter 13 is a Cultural Resources Management Plan that provides more detail about these resources and the BLM's management of them.

THE LAND

The lands in the NCA are described by 11 Biophysical Land Units (BLUs) or ecotypes (refer to Map A in the map pocket on the inside back cover of this GMP). A BLU is best defined as a piece of land that has characteristic soils, vegetation, landform, and drainage patterns. Each BLU is a distinctive integration of terrain/landform, soils, vegetation/landcover, and surface waters/drainage, and is the basic zone used to describe the existing environment in the NCA that would be affected by GMP proposals. Each BLU reflects part of the ecological situation on the ground in El Malpais.

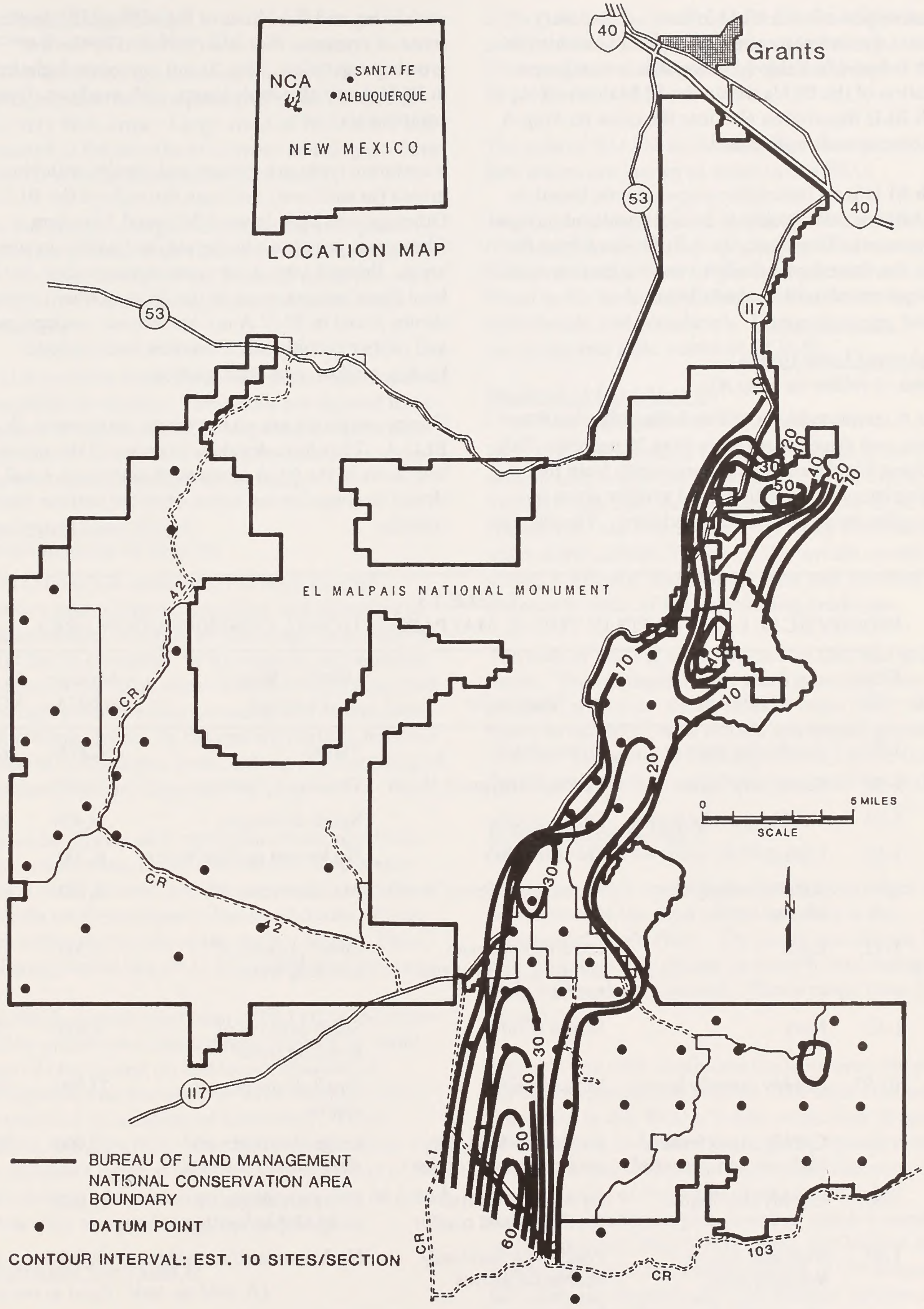
Terrain/landform in the El Malpais NCA is highly variable; the steepness of slopes varies radically and, frequently, within short distances. The NCA includes geologic features that vary from volcanic plugs and cinder cones, to cliffs and mesas formed of sandstone, to wide valleys and low, broken, rolling hills.

BLU soils are grouped by information on their degree of erodibility by wind or water, and on their parent materials and structures. Vegetation/landcover in the BLUs of the NCA is described by eight vegetation types: grass-shrub, sparse-bare, shrub-conifer, lava, mixed conifers, pinon-juniper woodland, ponderosa parkland, and deciduous groves.

In general, the NCA can be described as an arid landscape. The scarcity of surface waters in the NCA is a significant variable; therefore, drainages and playas are important attributes of the NCAs ecotypes, or BLUs. (For information regarding data sources of the core BLU attributes, and the geographic models used to derive the BLUs, refer to Appendix E).

Each of these combinations is unique and results in an ecotype that exhibits its own distinct set of ecological capabilities and limitations. For example, some BLUs have terrain that has very little change in elevation or slope, while others are broken by many small hills or steep-sided mesas. Some have soils that are highly susceptible to erosion, while others do not. The different vegetation types overlying the soils and variable terrain add to the NCA's ecological complexity. Limited surface waters are found in 5 of the NCA's ll BLUs, but are not an ecological component of the others.

Because each BLU is an unique combination, each can be expected to respond differently to the same management treatment or natural occurrence. Further, non-contiguous areas of a single BLU can be expected to respond similarly to the same treatment or occurrence.


NCA
SANTA FE
ALBUQUERQUE
NEW MEXICO
LOCATION MAP
40
Grants
53
40
117
53
EL MALPAIS NATIONAL MONUMENT
42
CR
CR
42
117
41
CR
CR
103
10
20
30
40
50
60
0
5 MILES
SCALE
N
BUREAU OF LAND MANAGEMENT NATIONAL CONSERVATION AREA BOUNDARY
DATUM POINT
CONTOUR INTERVAL: EST. 10 SITES/SECTION

MAP 1-3
RELATIVE DENSITY OF ANASAZI SITES BASED ON CLASS II INVENTORY

A description of each BLU follows. A summary of the acreage and percentage of each BLU within the NCA is found in Table 1-1. Map A is a visual representation of the BLUs within the El Malpais NCA. Each BLU description also lists the color on Map A that corresponds to that BLU.

Each BLU is an interactive response unit, based on the dynamic relationship of its biological and physical components. Therefore, the 11 BLUs describing the NCA are named generically to emphasize that each is a unique set of individual attributes.

Biophysical Land Unit A

(shown in yellow on Map A)

BLU A terrain consists of low rolling hills, shallow valleys, and slopes of no more than 20 percent. This landform has developed predominantly from the weathering of old lava flows and smaller areas of a soft, sedimentary rock called mudstone. Visually, the undulating and fluid lines of the rolling hills create a sense of openness that is accentuated by the low growing vegetation. The 20 soil groupings included in BLU A are all cobbly loams, with sandy or clayey components.

Vegetation types are grasses and shrubs, with blue grama (in sod form) and sage throughout the BLU. Other grasses include sand dropseed, bluestem wheatgrass, western wheatgrass, and galleta in some areas. Fringed sage is the most common sage, but at least three species occur in the NCA. Other common shrubs found in BLU A are horsebrush, snakeweed, and rubber rabbitbrush. Common forbs include kochia, mallow, and aster species.

Numerous playas are an important component of BLU A. They have developed on one of the oldest lava flows in the NCA in areas of numerous, small, closed drainage basins where seasonal surface water collects.

TABLE 1-1
BIOPHYSICAL LAND UNITS IN THE EL MALPAIS NATIONAL CONSERVATION AREA

BLU	Slope (%)	Soils	Vegetation	Surface Water/ Drainage	Acreage in NCA	% of NCA
A	1-10	Sandy clay loams	Grass-shrub	Playas	72,600	28
B	1-10	Sandy clay loams	Sparse-bare/grass shrub	Drainages/springs	7,600	3
C	3-50	Cobbly gravelly loams	Shrub-conifer	Small drainages	54,400	21
D	1-10	Lava	Shrub-conifer	No known surface water	6,200	2
E	1-3	Alkaline sandy clay loams	Sparse-bare/grass shrub	Marshy areas	3,100	1
F	1-12	Lava	Lava-lichen-shrub complex, grass-shrub, sparse-bare	Small pockets of standing water	6,300	2
G	1-10	Lava	Mixed conifer	Small pockets of standing water	8,400	3
H	10-50	Cobbly gravelly loams	Mixed conifer	Small drainages on slopes	33,200	13
I	<60	Cobbly sandy loams/ high erosion potential	Grass-shrub/shrub-conifer/mixed conifer	Large drainages on steep slopes/springs	52,000	20
J	<60	Cobbly clay loams	Grass-shrub/shrub-conifer/mixed conifer	Some drainages on steep slopes/springs	11,000	4
K	1-30	Volcanic & non-volcanic soils	Ponderosa parkland/ deciduous groves	No known surface water	4,500	2
		Areas with non-conforming landcover (do not fit BLU model because of surface disturbance)				1

Biophysical Land Unit B
(shown in orange on Map A)

BLU B is formed of numerous fan terraces, drainages, and flat floodplains, all of which tend to have very little slope. Large areas of BLU B are concentrated at the mouths of canyons and slopes where material is being deposited and eroded.

The flat and low-lying, uniform slopes and sparse vegetation provide little visual contrast. However, in late wet summers following seasonal rains, the open floodplains create a setting for blankets of yellow sunflowers.

BLU B contains three sandy clay loam soils that are susceptible to erosion. These soils are derived from sandstones and mudstones. Vegetation of this BLU is similar to that of BLU A, but cover is often more sparse or bare, especially in dry years.

Biophysical Land Unit C
(shown in green on Map A)

BLU C terrain is commonly the large angular southern and southwestern slopes and shoulders of hills and buttes of the NCA that range from 6,800 to 7,100 feet in elevation. In the western and northern portions of the NCA where volcanic activity has built up a high plain, the hills are composed of lava flows and volcanic debris. In the eastern portion, hills and buttes have developed from faulting and fracturing of sandstones and mudstones.

Varied landforms and vegetation create visual contrast in form, line, color, and texture. Slopes vary from 3 to 50 percent, and the potential for erosion of the soils on these slopes is low to moderate. Drainages follow the terrain of the steeper slopes. The 27 soil groupings in this BLU are cobbly gravelly loams.

The shrub-conifer vegetation of BLU C is characterized by pinons and oneseed junipers with an understory of blue grama (in sod form), snakeweed, rabbitbrush, and horsebrush. Tree clusters tend to be scattered in meadows of understory. These clusters may vary from 10 to 30 feet in diameter, with the meadows being at least twice the diameter of the tree clusters. An occasional ponderosa may be found at the edge or upper elevations of BLU C.

Biophysical Land Unit D
(shown in bright blue on Map A)

BLU D is composed of old lava flows. The terrain in BLU D is structurally low and rolling, similar to that in BLU A, but the landscape form is less expansive, and the textures are very coarse and uneven because of the vegetation. Slopes range generally from 1 to 10 percent.

The soils of BLU D are all volcanic. No natural surface waters are known to occur in this BLU.

Vegetation clusterings are similar to those of BLU C, but the predominant tree species is ponderosa rather than pinon and juniper. Apache plume and oak are found in the understory, along with snakeweed, rabbitbrush, and horsebrush. Hymenopappus, found on all volcanic soils, occurs in BLU D.

Biophysical Land Unit E
(shown in bright blue hatching on Map A)

BLU E is characterized by the flat terrain of an ancient lake bed in the Neck subunit of the NCA. The lake may have formed during a period of wetter climate (i.e., the Pleistocene Era) when more surface water could collect. The open, flat terrain creates a strong, horizontal visual component and provides panoramic vistas of the surrounding landscape.

The soils of BLU E are composed of lake bed sediments. Typical vegetation is alkali grass and blue grama in sod form. Small areas of water stand year-round in this BLU, with cattails and sedges growing in them. The water is discharged from Ojo de Gallo Spring, which occurs on private land near San Rafael.

Biophysical Land Unit F
(shown in black hatching on Map A)

BLU F terrain is comprised of the broken ridges and depressions of the most recent lava flow in the region, McCarty's Flow. The rough and chaotic lines of broken lava may change to smooth, undulating flows within short distances. Slopes range from 1 to 12 percent.

Exposed lava rock dominates the landcover, but a variety of vegetation is present. The most common vegetation in this BLU is lichen, more than 70 species of which have been identified. Cacti, Apache plume, goldeneye, and little bluestem are also common, with a large variety of forbs and shrubs found in low numbers. Ponderosa pine (some of which is stunted and misshapen), New Mexico olive, and juniper are widely scattered. The rugged texture of the lava surface contrasts dramatically with delicate pockets of vegetation.

Water can be found standing in lava depressions in wet years. In some lava tubes and caves, water and ice occur year-round.

Biophysical Land Unit G
(shown in purple hatching on Map A)

BLU G terrain is comprised of the flat to broken ridges and depressions of old lava flows, with slopes generally at 1 to 10 percent. The lava flows of BLU G are considered to be younger than those comprising BLU A, but older than those of BLU F.

Varied landforms create strong visual contrasts in form, line, color, and texture. Soils are old basalt and cobbly loam over basalt.

The landcover is dominated by a forest that is nearly all ponderosa pine, with some Douglas fir. Oak, currant, and Apache plume form the typical understory. Clusters of aspen occur near the edges of the lava flows. Muttongrass, mountain muhly, pine dropseed, and blue grama are common grasses. Sage is found everywhere.

As in BLU F, water can be found standing in the lava depressions of BLU G in wet years. Water and ice occur year-round in some lava tubes and caves.

Biophysical Land Unit H
(shown in purple on Map A)

BLU H terrain is dominated by the large forms of the northern and northwestern slopes and shoulders of hills and buttes, at elevations of 6,800 to 7,100 feet. In the western and northern portions of the NCA where volcanic activity has built up a high plain, the hills are composed of lava flows and volcanic debris. In the eastern portion, hills and buttes have developed from faulting and fracturing of sandstones and mudstones.

As in BLU G, varied landforms and vegetation create strong visual contrasts. The slopes of BLU H vary frequently within the range of 3 to 50 percent. The soil groups are cobbly, gravelly loams with low to moderate erosion potential. Naturally occurring drainages may follow the steeper slopes.

The vegetation of BLU H is a true mixed conifer woodland of pinon, one-seed juniper, alligator bark juniper, ponderosa, and an occasional Douglas fir. The understory consists of oak, currant, mountain mahogany, rabbitbrush, sage, and snakeweed. Grasses include pine dropseed, muttongrass, Junegrass, mountain muhly, and blue grama in sod form.

Biophysical Land Unit I
(shown in red on Map A)

BLU I terrain is a complex mix of ridges, buttes, and mesas that occur mostly on the east and north sides of the NCA. The buttes and mesas are large, flat-topped, usually rectangular hills, with nearly vertical sides and accumulated rubble at the bases. These landforms developed from sedimentary rocks broken by a series of north- to northeast-trending faults. The rubble consists of landslide deposits that developed along a major, retreating fault slope represented by the sandstone cliffs of Cebollita Mesa.
Many steep drainages cut through the landscape.

In a range of slopes up to 65 percent, the terrain features of BLU I comprise a very high frequency of change in landscape structure and form. The five soil grouping of BLU I are highly erodible. Vegetation varies from grass-shrub (typified by blue grama in sod form, sage, rabbitbrush, horsebrush) to pinon-juniper woodland and stands of ponderosa.

Biophysical Land Unit J
(shown in light blue on Map A)

BLU J is similar to BLU I, except the soils of BLU J are only moderately erodible. The ridges and buttes are composed of limestones and sandstones with valleys between individual ridges. The broken terrain of rock outcrop creates a dramatic visual contrast with the vegetated slopes; this contrast is accentuated during fall and spring.

The soils of BLU J are different from those in BLU I, and are of low to moderate erosion potential. Steep drainages follow the dominant slopes. The vegetation varies from grass-shrub (typified by blue grama in sod form, and sages) to a mixed conifer woodland of pinon, juniper, and ponderosa.

Biophysical Land Unit K
(shown in black on Map A)

BLU K is a land unit dominated by vegetative attributes. Generally, however, the terrain is open form landscape, including portions of the slopes and tops of cinder cones and some mesas.
No natural surface waters occur in this BLU. This ecotype tends to be located on old volcanic soils, or along the interface of volcanic and non-volcanic soils.

BLU K vegetation is composed of ponderosa parkland and deciduous groves. Ponderosa parkland is characterized by mature ponderosas (25+ years old), standing wide apart in grassy meadows. Most of the ponderosa parkland in the NCA is being invaded by young trees and shrubs.

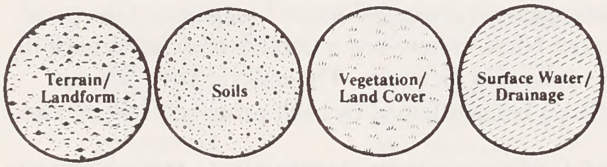
Deciduous groves are often found in combination with patches of parkland meadows. Sometimes the groves form an understory that is growing into the parkland meadows, thus forming a ponderosa-shrub complex. Deciduous groves are typically oak on older slopes and aspen along the edges of newer lava flows.

Section 5
Understanding This GMP

HOW BLUS ARE USED IN THIS GMP

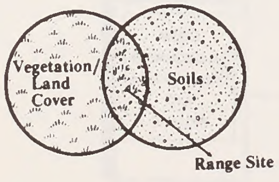
Biophysical Land Units are used in this GMP as planning zones to show the natural environments in the NCA that would be affected by the GMP proposals. They are the basis for an ecotype modeling strategy designed to examine the fundamental natural capabilities of the land to support different resource management proposals.

Many natural resource plans have been written using a description and analysis of the natural environment that is based on separate elements of the environment, such as:

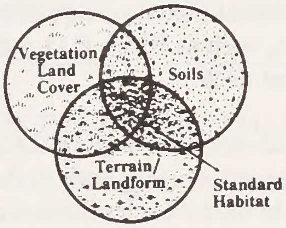


Analyzing separate elements makes it difficult to readily see that the environmental elements or ecological variables are interrelated.

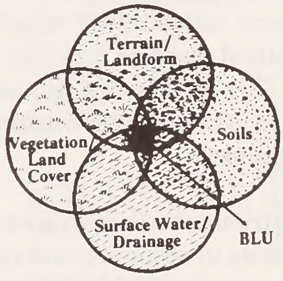
Other resource plans have grouped these variables to allow a more integrated picture of the existing natural resources. This has helped to show how management proposals affect a complex natural environment. For example, range management plans generally use a description of the natural environment called "Range Sites." They are formed by combining soil and vegetative information.



Wildlife habitat management plans generally integrate landform, soils, and vegetation into "Standard Habitat Sites."



Because this GMP is making recommendations for all natural resource uses in the NCA, a system has been developed for analyzing all these resources together. This system uses the Biophysical Land Units (BLUs). BLUs combine both the Range Site and the Standard Habitat Sites systems, and add the element of "surface water/drainage":



BLUs achieve an integrated overview of the relationship between terrain/landform, soils, vegetation/landcover, and surface water/drainage. They act as a framework for an ecologically integrated inventory.

Not only can the range and wildlife programs use BLUs for their planning needs, but many other resource programs can use them as well. BLUs are ecological zones compatible with all the BLM's different natural resource programs. Because the BLU represents an integrated ecotype, each GMP proposed action can be analyzed in terms of its impact on individual aspects of the environment such as soils or vegetation, as well as to each ecotype as a whole.

All resource specialists involved in developing this GMP have used this same BLU data base and Map A when examining and discussing the NCA's existing natural environment. This has made impact analysis and program development easier and more accurate.

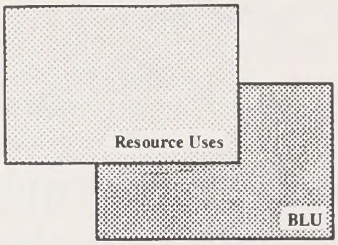
Map A shows that zoning by ecotype or BLU displays the "patchwork" nature of the existing environment in the NCA. This has been an important consideration for all resource proposals. Zoning by BLU also displays and quantifies those ecotypes that are small within the NCA, such as BLUs E (1 percent), D, F, and K (2 percent each).

These integrated elements of the NCA's environment that have influenced the proposals in the GMP might have been overlooked if each resource component had been examined separately. BLUs readily display the complexity and diversity of the NCA's existing environment. They are also not biased toward any specific resource management program, because they are based on an inventory common to all programs.

THE PLANNING PROCESS USED TO DEVELOP THIS GMP

After the BLUs were used to describe the existing natural environment within the NCA, information about existing natural resource uses was combined with the BLUs. This combination was used to help managers recommend the best allocations for the NCA's natural resources.

Each BLU has attributes with certain natural limitations and capabilities to accommodate each type of natural resource use. The BLUs constitute an inventory of the existing natural environment. The environment responds to change in predictable ways; such responses can be managed if they are adequately understood. The BLU information helps provide the basis on which managers make proposals for allocating and using NCA lands, because the BLUs help provide accurate knowledge of the NCA's resources and information about the natural limits of the land.

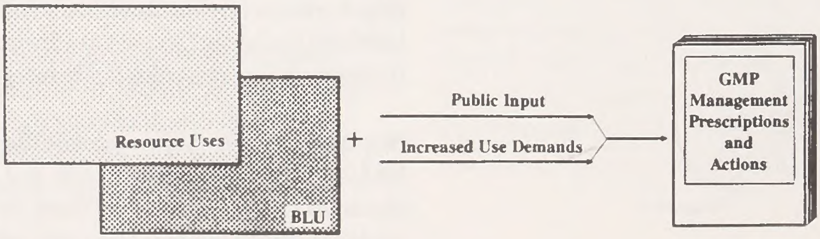


After BLU data was combined with information on existing natural resource uses, other layers of information were added to form a more complete picture of potential land use in the NCA. One additional source of information was an assessment of the needs and expectations of the public. Another was the projections of increased demand for natural resource conservation and uses in the NCA.

After examining the needs for each resource use along with the natural limitation of each BLU, resource specialists have recommended specific management prescriptions and actions to take place in the NCA. These are reflected in tables in each of the following chapters. The natural environment (BLU) being affected by each proposal is listed also.

RELATIONSHIP BETWEEN RESOURCE ISSUES AND THE BLUs

The following tables show how the natural resource proposals discussed in this GMP have been based on analysis that has used the BLUs to help design them. Column l of each table describes the natural environment (BLUs). Column 2 lists each BLU's natural capabilities and limitations that are important to the analysis of each particular issue. The last column lists additional layers of information helpful to resource managers, and is called "Management Considerations."



Recreation and the BLUs

The national capabilities and limitations of each BLU for recreation management rely on several variables. The type of landscape displayed by each BLU comprises the natural setting available to the recreator. The type of landscape and its complexity also determines the type of social setting available to the recreator. The greater the landscape complexity, the greater the ability of the BLU to provide visual screening for several different user groups.

In each BLU is a combination of recreation features the recreator can select to experience. Each BLU also has a set of management considerations that relate to its suitability for different types of recreation use, appropriate season for use and accessibility. Other management considerations include how much of each BLU is available to the recreator using the motorized forms of transportation (in roaded natural areas and semi-primitive motorized areas) and using non-motorized transportation (in semi-primitive non-motorized areas and primitive areas).

Wilderness and the BLUs

The natural capabilities and limitations of each BLU for wilderness management centers on the ability of each BLU to retain naturalness and to provide solitude or primitive and unconfined recreations. Components critical to each BLU's ability to retain naturalness are the type of vegetative cover combined with the landscape complexity or the type of terrain/landform. The greater the landscape complexity, the greater the BLU's ability to absorb limited disturbance. The Visual Absorption Capability (VAC) calculated for each BLU help to identify this relationship.

TABLE 1-2
NATURAL CAPABILITIES AND LIMITATIONS OF THE BLUS FOR RECREATION MANAGEMENT

Existing Natural Res. (BLUs)	Natural Capabilities & Limitations of the BLUs				Management Considerations	
	Landscape	VAC*	Recreation Features	Social Setting	Recreation Variables	% of ROS Category in NCA/Acreage**
A	Open terrain, rolling hills & swales, grasslands, some wide vistas, ephemeral playas	10	Seasonal viewing of waterfowl, coyotes, pronghorns, & songbirds; prey available for raptors; hunting opportunities	Openness provides very little visual screening of other parties	Openness constrains screening of any proposed development; limited waters; seasonal playas; low to moderate erosion potential will accommodate recreational use by motorized vehicles, hikers, bikers, & horseback riders	P 19/ 477 SPNM 28/50,802 SPM 23/12,152 RN 36/ 8,426
B	Open terrain, gentle slopes, drainages (some w/ perennial springs)	8	Prairie dog towns, abundant wildflowers, sunflowers, beeplant, burrowing owls; waterfowl viewing; birdwatching; photography	Openness & sparse vegetation provide little visual screening of other parties	High soil erodibility; development must accommodate sensitive soils; springs are located on private land; uncontrolled recreational use of springs may damage sensitive habitat; seasonal flooding events may create hazards along unimproved dirt roads; areas accessible from NM 117	P 4/ 240 SPNM 2/ 3,603 SPM 2/ 1,154 RN 11/ 2,590

different natural resource programs. Because the BLU represents an integrated ecotype, each GMP proposed action can be analyzed in terms of its impact on individual aspects of the environment such as soils or vegetation, as well as to each ecotype as a whole.

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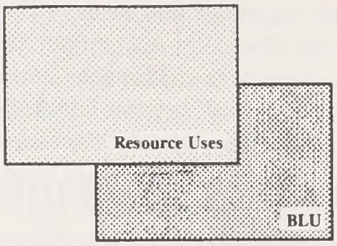
THE PLANNING PROCESS USED TO DEVELOP THIS GMP

After the BLUs were used to describe the existing natural environment within the NCA, information about existing natural resource uses was combined with the BLUs. This combination was used to help managers recommend the best allocations for the NCA's natural resources.

Each BLU has attributes with certain natural limitations and capabilities to accommodate each type of natural resource use. The BLUs constitute an inventory of the existing natural environment. The environment responds to change in predictable ways; such responses can be managed if they are adequately understood. The BLU information helps provide the basis on which managers make proposals for allocating and using NCA lands, because the BLUs help provide accurate knowledge of the NCA's resources and information about the natural limits of the land.



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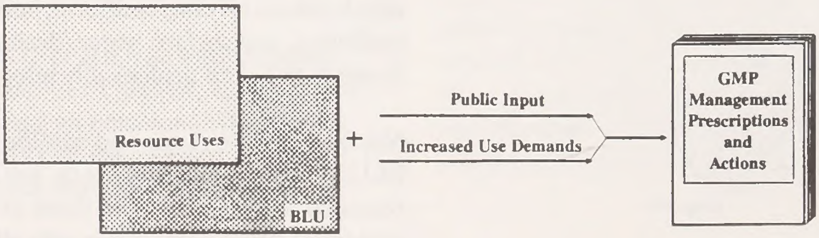
After examining the needs for each resource use along with the natural limitation of each BLU, resource specialists have recommended specific management prescriptions and actions to take place in the NCA. These are reflected in tables in each of the following chapters. The natural environment (BLU) being affected by each proposal is listed also.

RELATIONSHIP BETWEEN RESOURCE ISSUES AND THE BLUs

The following tables show how the natural resource proposals discussed in this GMP have been based on analysis that has used the BLUs to help design them. Column l of each table describes the natural environment (BLUs). Column 2 lists each BLU's natural capabilities and limitations that are important to the analysis of each particular issue. The last column lists additional layers of information helpful to resource managers, and is called "Management Considerations."



Recreation and the BLUs

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TABLE 1-2
NATURAL CAPABILITIES AND LIMITATIONS OF THE BLUS FOR RECREATION MANAGEMENT

Existing Natural Res. (BLUs)	Natural Capabilities & Limitations of the BLUs				Management Considerations	
	Landscape	VAC*	Recreation Features	Social Setting	Recreation Variables	% of ROS Category in NCA/Acreage**
A	Open terrain, rolling hills & swales, grasslands, some wide vistas, ephemeral playas	10	Seasonal viewing of waterfowl, coyotes, pronghorns, & songbirds; prey available for raptors; hunting opportunities	Openness provides very little visual screening of other parties	Openness constrains screening of any proposed development; limited waters; seasonal playas; low to moderate erosion potential will accommodate recreational use by motorized vehicles, hikers, bikers, & horseback riders	P 19/ 477 SPNM 28/50,802 SPM 23/12,152 RN 36/ 8,426
B	Open terrain, gentle slopes, drainages (some w/ perennial springs)	8	Prairie dog towns, abundant wildflowers, sunflowers, beeplant, burrowing owls; waterfowl viewing; birdwatching; photography	Openness & sparse vegetation provide little visual screening of other parties	High soil erodibility; development must accommodate sensitive soils; springs are located on private land; uncontrolled recreational use of springs may damage sensitive habitat; seasonal flooding events may create hazards along unimproved dirt roads; areas accessible from NM 117	P 4/ 240 SPNM 2/ 3,603 SPM 2/ 1,154 RN 11/ 2,590

TABLE 1-2 -- CONTINUED

Existing Natural Res. (BLUs)	Natural Capabilities & Limitations of the BLUs				Management Considerations	
	Landscape	VAC*	Recreation Features	Social Setting	Recreation Variables	% of ROS Category in CA/Acreage**
C D G H	Highly varied terrain, steep-sided volcanic cones, hills, & ridges Open meadows w/ forested areas of pinon-juniper & ponderosa pine, interspersed w/ open meadows Understory of brush, aspen, & grasses	12	Primitive camping along margins of meadows & forest Dead & down firewood available for camping (outside designated wilderness) Wildlife viewing & hunting for elk, deer, bear, turkey & other birds Visual contrast between conifer & deciduous vegetation enhanced during spring & fall	Low to moderate erosion; soils will accommodate recreational use by hikers, bikers, & horseback riders Visual screening allows for development of facilities w/ limited visual impact Limited water Accessible from CR 42 & primitive roads in Brazo subunit Some lands privately owned & subdivided in Continental Divide subunit		P 57/ 3,526 SPNM 36/65,226 SPM 53/27,505 RN 26/ 5,893
E	Flat open area w/ marshy habitat, wide regional vistas	10	Viewing of egrets, heron, ibis, 13 other species of waterfowl	Openness provides little visual screening Closeness to NM 53 leads to frequent contact w/ others	Private land accessible from NM 53 Openness limits screening of proposed development	P 0 SPNM 2/ 3,072 SPM 0 RN 0
F	Rugged terrain; recent lava w/ little soil development, sinkholes, high-angle lava walls	12	Visual contrast dramatic where lava meets vertical sedimentary cliffs Vegetation contrasts sharply w/black lava	Rugged terrain provides screening beyond 1 mile at high points	Accessible from NM 117, S. Big Narrows, & National Monument Opportunity for cooperative management w/NPS Access to Cerritos de Jaspe subunit is across private land Expect frequent contact at developments	P 18/ 1,119 SPNM 2/ 3,578 SPM 2/ 517 RN 4/ 867

TABLE 1-2 -- CONCLUDED

Existing Natural Res. (BLUs)	Natural Capabilities & Limitations of the BLUs				Management Considerations	
	Landscape	VAC*	Recreation Features	Social Setting	Recreation Variables	% of ROS Category in CA/Acreage**
I	Broken terrain w/ variety of vegetation (conifers, grasses, shrubs); steep canyons & mesas	12	Broken terrain w/visual contrast between vegetation types; hunting opportunities; wildlife viewing of deer, elk, songbirds	Variable terrain & vegetation provide visual screening	High potential for soil erosion; any development must accommodate sensitive soils High-density cultural resources Accessible from NM 117	P .5/ 27 SPNM 23/40,538 SPM 14/ 7,477 RN 17/ 3,922
J	Broken terrain; vibrant reds contrast w/greys; vegetation varies	12	Broken terrain (lava & sandstone), dramatic display of colors; visual contrast changes w/ season; coyotes, bears, deer, raptors, songbirds	Variable terrain & vegetation provide visual screening	Erosion potential of soil (low to moderate) less severe than in BLU I Some access limited by private land Opportunities for cooperative backcountry management w/NPS Limited water; developed water for grazing & wildlife	P 0 SPNM 5/ 8,300 SPM 5/ 2,597 RN 1/ 143
K	Ponderosa parkland & deciduous vegetation	12	Wildlife viewing	Isolated patches not accessible to many people	Only small occurrences of BLU K in NCA	P 0 SPNM 2/ 4,050 SPM 1/ 430 RN 0

Notes: * VAC = Visual Absorption Capability.
** P = primitive; SPNM = semi-primitive non-motorized;
SPM = semi-primitive motorized; RN = roaded natural.

The complexity of each BLU, its related ability to absorb human use, and its ability to retain a natural character also influences its ability to provide solitude. The greater the landscape and vegetative complexity, the greater the opportunity to screen user groups one from the other.

Because the natural attribution of each BLU are different, BLUs frequently display different recreation features. These features are generally dependant on each ecotype. The supplemental wilderness values of wildlife and geologic features also vary by BLU.

A variable that is important for managers to consider is the amount of each BLU that is being managed in a wilderness condition, compared to the total amount of that BLU available in the NCA. In wilderness, natural ecological processes are allowed to function with a minimum of human influence.

TABLE
NATURAL CAPABILITIES AND LIMITATIONS

	Natural Capabilities and Limitations of the BLUs				
	Ability to Retain Naturalness			Ability to Provide Solitude	Ability to Provide Primitive Recreation
Natural Resources (BLUs)	Existing Plant Community	Landscape Complexity	VAC*	Social Setting	Recreation Features
A	Grass-shrub	Open terrain, rolling hills & swales, grasslands, some wide vistas, ephemeral playas	10	Openness provides very little visual screening of other parties	Seasonal viewing of waterfowl, coyotes, pronghorns, & songbirds; prey available for raptors; hunting opportunities
B	Sparse-bare, grass-shrub	Open terrain, gentle slopes, drainages (some w/perennial springs)	8	Openness & sparse vegetation provides little visual screening of other parties	Prairie dog towns, abundant wildflowers, sunflowers, beeplant, burrowing owls; waterfowl viewing; birdwatching; photography
C	Shrub-conifer	Highly varied terrain, steep-sided volcanic cones, hills & ridges Open meadows w/forested areas of pinon-juniper & ponderosa pine, interspersed w/ open meadows Understory of brush, aspen, & grasses	12	Low to moderate erosion; soils will accommodate recreational use by hikers & horseback riders Good visual screening Limited water Accessible from CR 42 & primitive roads in Brazo subunit	Primitive camping along margins of meadows & forest Dead & down firewood available for camping Wildlife viewing & hunting for elk, deer, bear, turkey, & other birds Visual contrast between conifer & deciduous vegetation enhanced during spring & fall
D	Shrub-conifer	Highly varied terrain, steep-sided volcanic cones, hills & ridges Open meadows w/forested areas of pinon-juniper & ponderosa pine, interspersed w/open meadows Understory of brush, aspen, & grasses	12	Low to moderate erosion; soils will accommodate recreational use by hikers & horseback riders Good visual screening Limited water	Primitive camping along margins of meadows & forest Dead & down firewood available for camping Wildlife viewing & hunting for elk, deer, bear, turkey, & other birds Visual contrast between conifer & deciduous vegetation enhanced during spring & fall

1-3
OF THE BLUS FOR WILDERNESS MANAGEMENT

Natural Capabilities and Limitations of the BLUs		Management Considerations (Ecotype Representations)**		
Supplemental Values				
Wildlife	Geologic Features	CWU (Ac/%)	WMWU (Ac/%)	NCA (Ac/%)
12 species of waterfowl, 6 species of shorebirds; 5 species of amphibians; invertebrates	Rolling terrain characteristic of oldest lava flows in NCA	10,225/16	19,380/48	29,606/11
Mule deer, pronghorn; pocket gophers; raptors; 3 species of sparrows, buntings	Terrain develops on soft sedimentary rock (mudstone) of Cretaceous Age (165 million years); mudstone contains both marine & terrestrial fossils; marine fossils include oyster & ammonite shells			
Pronghorn; Brewer's sparrow, sage sparrow				
Pronghorn, coyotes; jackrabbits, cottontails, prairie dogs, badger, 5 species of mice; burrowing owls, golden eagles, 3 species of falcons, 4 species of hawks; roadrunners, horned larks, quail, dove, 3 species of flycatchers, thrashers, mockingbirds, cowbirds, 6 species of sparrows; 5 species of lizards, snakes				
Deer; voles; rails, 2 species of waterfowl, turkey; amphibians, reptiles	Pocket gophers, 3 species of mice; burrowing owls, raptors; reptiles	1,792/ 3	91/.23	1,883/.72
Mule deer, elk, coyotes; 3 species of rodents; 15 species of wintering birds, turkeys, 3 species of warblers, 3 species of flycatchers, 3 species of corvids, 2 species of wrens; snakes, lizards	Weathered lava flows w/pressure ridges, lava walls, & possibly older, collapsed, lava tubes; sedimentary rocks (sandstones & conglomerates); structures in rocks provide information about direction & strength of water deposition; internal structures give information about how rocks were formed, type of terrain providing deposited material, & direction of flow	3,786/ 6	9,397/23	13,183/ 5
Mule deer, elk; Abert's squirrel; turkey, 12 species of wintering birds, insectivorous birds, corvids	Older weathered lava along margins of recent flows; large kipuka (island) surrounded by recent flows; recent tectonic activity has caused fracturing & faulting w/in kipuka (Big Hole in the Wall; ridges of Cretaceous sandstone where internal geometry shows ancient channel patterns	338/.54	4,529/11	4,868/2

TABLE 1-3 -

	Natural Capabilities and Limitations of the BLUs				
	Ability to Retain Naturalness			Ability to Provide Solitude	Ability to Provide Primitive Recreation
Natural Resources (BLUs)	Existing Plant Community	Landscape Complexity	VAC*	Social Setting	Recreation Features
F	Lava-lichen, grass-shrub, sparse-bare	Rugged terrain; recent lava w/little soil development, sinkholes, high-angle lava walls	12	Rugged terrain provides screening beyond 1 mile at high points; expect frequent contact at developments	Visual contrast dramatic where lava meets sedimentary vertical cliffs; vegetation contrasts sharply w/black lava
G	Mixed conifer	Highly varied terrain, steep-sided volcanic cones, hills & ridges Open meadows w/forested areas of pinon-juniper & ponderosa pine, interspersed w/ open meadows Understory of brush, aspen, & grasses	12	Low to moderate erosion; soils will accommodate recreational use by hikers & horseback riders Visual screening allows for development of facilities w/limited visual impact Limited water Accessible from CR 42 & primitive roads in Brazo subunit	Primitive camping along margins of meadows & forest Dead & down firewood available for camping Wildlife viewing & hunting for elk, deer, bear, turkey, & other birds Visual contrast between conifer & deciduous vegetation enhanced during spring & fall
H	Mixed conifer	Highly varied terrain, steep-sided volcanic cones, hills & ridges Open meadows w/forested areas of pinon-juniper & ponderosa pine, interspersed w/open meadows Understory of brush, aspen, & grasses	12	Low to moderate erosion; soils will accommodate recreational use by hikers & horseback riders Good visual screening Limited water Accessible from CR 42 & primitive roads in Brazo subunit	Primitive camping along margins of meadows & forest Dead & down firewood available for camping Wildlife viewing & hunting for elk, deer, bear, turkey, & other birds Visual contrast between conifer & deciduous vegetation enhanced during spring & fall
I	Grass-shrub, shrub-conifer, mixed conifer	Broken terrain w/variety of vegetation (conifers, grasses & shrubs); steep canyons & mesas	12	Variable terrain & vegetation provide visual screening	Broken terrain w/visual contrast between vegetation types; hunting opportunities; wildlife viewing of deer, elk, songbirds
J	Ponderosa-Douglas fir, oak-shrub	Broken terrain; vibrant reds contrast w/greys; vegetation varies	12	Variable terrain & vegetation provide visual screening	Broken terrain, dramatic display of colors; visual contrast changes w/season; coyotes, bears, deer, raptors, songbirds
K	Ponderosa park-land, deciduous vegetation	Ponderosa parkland	12	Isolated patches not accessible to many people	Wildlife viewing

Notes: *VAC = Visual Absorption Capability.
**CWU = Cebolla Wilderness Unit; Ac/% = acres and percent of BLU in unit;
WMWU = West Malpais Wilderness Unit; NCA = National Conservation Unit.

- CONCLUDED

Natural Capabilities and Limitations of the BLUs				
Supplemental Values		Management Considerations (Ecotype Representations)**		
Wildlife	Geologic Features	CWU (Ac/%)	WMWU (Ac/%)	NCA (Ac/%)
	Well-preserved surface lava features; pressure ridges, collapse structures, & lava tubes	5/.01	2,021/5	2,026/.77
Southern spotted owl; some bats Deer, elk, bear, bobcats, porcupine; raptors; hole-nesting mammals & birds; Abert's squirrel		788/ 1	2,958/7	3,746/ 1
Southern spotted owl; some bats Deer, elk, bear, cougar, bobcat, porcupine; some raptors; 6 species of rodents, Abert's squirrel; turkey, migratory birds, warblers, Western bluebirds, hummingbirds Deer, elk, bear	Weathered lava walls & flows; sandstone w/internal channel geometry & current structures; carbonaceous mudstones w/plant debris	4,727/ 8	1,695/ 4	6,422/2
Deer, elk, desert bighorn, cougar; small mammals & birds; some raptors; lizards	Sandstone w/internal channel geometry & current structures; carbonaceous mudstones w/plant debris	33,431/54	40/.1	33,470/13
Deer, elk, bear, coyotes; waterfowl, shorebirds; amphibians; invertebrates	Collapsed blocks of lava-capped sandstone & mudstone off edge of Cebollita Mesa create landslide deposits	4,371/ 7	0	4,371/2
Deer, bear; Abert's squirrel Bear; hole-nesting mammals & birds; many kinds of birds, warblers Deer, elk, bear; small mammals; turkey, 10 species of birds	Collapsed blocks of lava-capped sandstone & mudstone off edge of Cebollita Mesa create landslide deposits	2,815/5	0	2,815/1

Wildlife and the BLUs

The natural capabilities and limitations of each BLU for wildlife management depend on the habitat features that are components of each BLU. Once the features have been identified and quantified, managers can determine a management emphasis for each habitat feature (and therefore an emphasis for each BLU). Managers can also begin to consider what species will be affected by the selected management emphasis, because certain species depend on the wildlife habitat provided by each BLU.

TABLE 1-4
NATURAL CAPABILITIES AND LIMITATIONS OF THE BLUS
FOR WILDLIFE HABITAT MANAGEMENT

	Natural Capabilities & Limitations of the BLUS		Management Considerations	
Existing Natural Resource (BLUs)	Existing Plant Community	Habitat Feature	Management Emphasis for Habitat Feature	Species Affected
A	Grass-shrub	Playas	Treat as sensitive	12 species of waterfowl, 6 species of shorebirds; 5 species of amphibians; invertebrates
		Rabbitbrush	Control & protect ground cover for burrowing animals	Mule deer, pronghorn; pocket gophers; raptors; 3 species of sparrows, buntings
		Grass-shrub components	Discourage loss of sage in grasslands	Pronghorn; Brewer's sparrow, sage sparrow
			Maintain open condition	Pronghorn, coyotes; jackrabbits, cottontails, prairie dogs, badger, 5 species of mice; burrowing owls, golden eagles, 3 species of falcons, 4 species of hawks; roadrunners, horned larks, quail, dove, 3 species of flycatchers, thrashers, mockingbirds, cowbirds, 6 species of sparrows; 5 species of lizards, snakes
		Limited water supply	Ensure continued supply of water for game	Pronghorn; quail
			Develop additional waters where existing waters are more than 2 sections apart (refer to Map 3-6 in Chapter 3)	
B	Sparse-bare, grass-shrub	Drainages	Treat as sensitive	Deer; voles; rails, 2 species of waterfowl, turkey; amphibians, reptiles
		Erodible soils	Protect against loss of erodible soils	
			Manage for increasing cover	
		Deep soils	Manage for increasing cover	Pocket gophers, 3 species of mice; burrowing owls, raptors; reptiles
C	Shrub-conifer	Patchwork of meadows & pinon-juniper	Allow removal of dead & down wood	Mule deer, elk, coyotes; 3 species of rodents; 15 species of wintering birds, turkeys, 3 species of warblers, 3 species of flycatchers, 3 species of corvids, 2 species of wrens; snakes, lizards
			Use fire to maintain patchwork habitats	
			Deter cutting of mature live pinons	

TABLE 1-4 -- CONTINUED

Existing Natural Resource (BLUs)	Natural Capabilities & Limitations of the BLUS		Management Considerations	
	Existing Plant Community	Habitat Feature	Management Emphasis for Habitat Feature	Species Affected
D	Shrub-conifer	Patchwork of meadows, ponderosas, & junipers on lava soils	Use fire to maintain patchwork habitats	Mule deer, elk; Abert's squirrel; turkey, 12 species of wintering birds, insectivorous birds, corvids
E	Alkali grass, grass-shrub	Marsh flats	Treat as sensitive	Egrets, black-crowned night heron, whitefaced ibis, 13 species of waterfowl, marsh hawks, 2 species of rails, 2 species of sandpipers, Wilson's phalaropes, yellow-throats, 2 species of blackbirds; amphibians
			Encourage maintenance of habitat by private owners	
F	Lava-lichen	Lava	Look for new species of lichen & cactus	
G	Mixed conifer	Mixed conifer, ponderosa forest on lava soils	Look for old growth stands	Southern spotted owl; some bats
			Allow removal of some dead & down wood to protect against damaging fire	Deer, elk, bear, bobcats, porcupine; raptors; hole-nesting mammals & birds; Abert's squirrel
			Allow fire to fill its natural role	
			Deter loss of & recruit dead, standing wildlife trees	
H	Mixed conifer	Mixed conifer forest on non-lava soils	Look for old-growth stands	Southern spotted owl; some bats
			Allow removal of some dead & down wood	Deer, elk, bear, cougar, bobcat, porcupine; some raptors; 6 species of rodents, including Abert's squirrel; turkey, migratory birds, warblers, Western bluebirds, hummingbirds
			Allow fire to fill its natural role	
			Deter loss of dead standing wildlife trees & down rotting logs	
			Encourage growth of browse understory	Deer, elk, bear
			Increase waters where surveys indicate need	
I	Grass-shrub, shrub-conifer, mixed conifer	Broken terrain	Encourage growth of ground cover, forage & browse	Deer, desert bighorn, cougar; some small mammals & birds
		Erodible soils	Encourage growth of ground cover and brush on slopes, deter erosion on slopes	Deer, elk, desert bighorn; 6 species of small mammals; some raptors; 10 species of birds; lizards
J	Ponderosa, Douglas fir, oak-shrub	Broken terrain		
		Some livestock tanks 1 acre or larger in size	Treat tanks as sensitive & encourage allottee to maintain	Deer, elk, bear, coyotes; waterfowl, shorebirds; amphibians; invertebrates

TABLE 1-4 -- CONCLUDED

Existing Natural Resource (BLUs)	Natural Capabilities & Limitations of the BLUS: Existing Plant Community	Natural Capabilities & Limitations of the BLUS: Habitat Feature	Management Considerations: Management Emphasis for Habitat Feature	Management Considerations: Species Affected
K	Ponderosa parkland, deciduous vegetation	Ponderosa parkland	Allow fire to fill its natural role	Deer, bear; Abert's squirrel
			Protect standing dead wildlife trees	Bear; hole-nesting mammals & birds; many kinds of birds, including warblers
			Protect down rotting logs	
		Patches of oak	Allow fire to fill its natural role	Deer, elk, bear; small mammals; turkey, 10 species of birds
			Maintain patchwork character	

Range Management and the BLUs

The natural capabilities and limitations of the BLUs for range management are influenced by several variables. Each BLU has soils that help determine the plant community that is likely to grow there. This potential plant community is sometimes different than the existing plant community because human influences and climatic conditions also help to determine the existing plant community.

Some of the natural ecological variables that influence each BLU's suitability for grazing include the amount of grassland or woody species, how steep the slopes and, what type of soils are present, and how erodible they are. In combination, these ecological variables result in each BLU exhibiting a natural overall ecological suitability for grazing. This has been expressed in Table 1-5 below in a general way by the terms High (H), Moderate (M), and Low (L).

All of this information is useful to managers when they are attempting to prescribe a desired plant community for each BLU, especially as it relates to both range management and wildlife habitat objectives. Additional management considerations include the types and amount of each BLU in each range management category.

TABLE 1-5
NATURAL CAPABILITIES AND LIMITATIONS OF THE BLUS FOR RANGE MANAGEMENT

Existing Natural Resource (BLUs)	Natural Capabilities & Limitations of the BLUs: Potential Plant Community	Existing Plant Community	Ecological Variables Influencing Suitability For Grazing*	Ecological Suitability for Grazing	Management Considerations (Acres/ Category**)
A	Grass-shrub, grass-forb, mixed conifer	Grass-shrub	High grass-shrub components, moderate slopes	H	46,000/I 2,300/M
B	Grass-shrub, pinon-juniper, rabbitbrush, mixed conifer	Sparse-bare, grass-shrub	Erodible soils, multiple drainages	L	5,600/I 500/M

TABLE 1-5 -- CONCLUDED

Existing Natural Resource (BLUs)	Natural Capabilities & Limitations of the BLUs				Management Considerations (Acres/ Category**)
	Potential Plant Community	Existing Plant Community	Ecological Variables Influencing Suitability For Grazing*	Ecological Suitability for Grazing	
C	Grass-shrub, mixed conifer	Shrub-conifer	Increasing woody component w/grass-shrub	M-H	40,200/I 2,400/M
D	Ponderosa parkland, ponderosa-Douglas fir, pinon-juniper shrub, oak-shrub	Shrub-conifer	Increasing woody component w/grass-shrub	M-H	1,100/I 300/M
E	Alkali grass	Alkali grass, grass-shrub	Alkali soils, less palatable grass	L	300/I
F	Ponderosa-Douglas fir	Lava-lichen	Lava	L	6,400/I 400/M
G	Ponderosa parkland, ponderosa-Douglas fir, oak-shrub, pinon-juniper, mixed conifer	Mixed conifer	Woodland overstory, lava soils, lower grass component	M	2,200/I 3,000/M
H	Grass-shrub, mixed conifer	Mixed conifer	Woodland overstory w/lower grass component	M	29,800/I 1,700/M
I	Pinon-juniper, grass-shrub, ponderosa-oak	Grass-shrub, shrub-conifer, mixed conifer	Steep slopes, highly erodible soils	L	47,700/I 3,900/M
J	Ponderosa-Douglas fir, oak-shrub	Grass-shrub, shrub-conifer, mixed conifer	Steep slopes, moderately erodible soils	M	11,000/I 75/M
K	Ponderosa parkland, deciduous vegetation, mixed conifer, ponderosa-oak	Ponderosa, deciduous	Good grass understory	H	4,400/I 100/M

Notes: * H = high; L = low; M = moderate. ** I = improve; M = maintain.

Visual Resources and the BLUs

Calculating the Visual Absorption Capability (VAC) of each BLU helps to identify those BLUs that are most visually vulnerable. BLUs with a numerical score that falls within a range of 6 to 9 have a relatively low ability to withstand management manipulations without significantly affecting their visual character (a low VAC). BLUs with a numerical score that falls within the range of 10 to 14 have a moderate VAC, while those with a numerical score that falls between 15 and 18 have a relatively high VAC. Table 1-6 displays the VAC values for the BLUs in the NCA. The terms used in this table are further explained in Appendix L.

TABLE 1-6
NATURAL CAPABILITIES AND LIMITATIONS OF THE BLUS
FOR VISUAL RESOURCES MANAGEMENT*

Existing Natural Resource (BLUs)	Natural Capabilities and Limitations for Visual Resources			Landscape Complexity			
	Slope	Rock & Soil Contrast	Vegetative Screening	Landform Diversity	Vegetative Diversity	Vegetative Regeneration (Soil Productivity)	Management Considerations (VAC)**
A	3	2	1	1	1	2	10
B	3	1	1	1	1	1	8
C	2	2	1	2	2	2	11
D	2	3	1	2	2	2	12
E	3	2	1	1	1	2	10
F	3	3	1	2	1	2	12
G	1	3	2	2	2	2	12
H	2	2	2	2	2	2	12
I	2	2	2	3	2	1	12
J	2	2	2	3	2	2	12
K	2	2	2	2	2	2	12

Notes: * For further information on the variables in this table, refer to Appendix M.
** VAC--Visual Absorption Capability; values represent the following:
6-9 = low VAC; 10-14 = moderate VAC; 15-18 = high VAC.

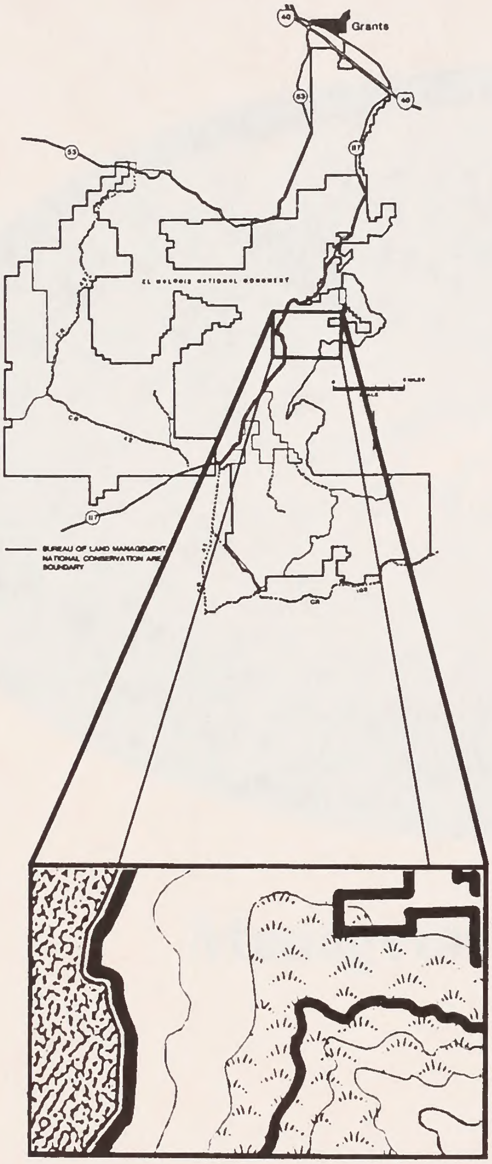
REGIONAL PLANNING TO SITE PLANNING

The same inventory of ecotypes (BLUs) used for the regional NCA planning done in this Draft GMP will be used along with additional layers of information (or a resampling of existing BLU variables) to do more site-specific analysis for site planning (refer to Figure 1-1). This next level of planning will be displayed in the Final GMP in the Chapters on Monitoring (Chapter 7) and Implementation (Chapter 8). Such site-specific analysis will be used on a limited basis only where needed. Because this more site-specific information is derived from the same BLU data base as the regional information, all information generated can be aggregated back into the original data structure.

The question of where to put the Continental Divide National Scenic Trail is a good example of the type of resource questions that can be answered by using the BLUs for regional planning purposes as well as for site planning. An examination of the BLUs reveals that soils on the west side of the NCA are far more stable than those on the east side. The west side can probably absorb the heavier recreation traffic the national trail will bring. Therefore, it is recommended in this GMP that the trail be moved from the east side of the NCA to the west side. Analysis using BLUs has also alerted resource specialists to potential conflicts with sensitive wildlife areas, and which habitats the recreator would experience when traveling along the trail. (Refer to Maps A, B, 3-5 in Chapter 3, and C-1 in Appendix C for more information on the BLUs and the proposed trail route.)

During site planning for the trail, the BLUs will be reviewed to determine areas that have stable soils and slopes between 10 and 40 percent. An examination of aspect will display both northern and southern exposure alternatives. If the primary visitor use time is during the summer, the north aspect (which affords shade and retains soil moisture) will be favored.

The BLUs will be analyzed at a 30-meter resolution to enable BLM staff to examine detail on vegetative density. Potential dominant viewshed points will be noted. With all of this information available to help in narrowing alternative locations for the trail, managers will decide where on-the-ground fieldwork will be needed to allow completion of the site plan.


Grants
40
53
117
EL MALPAIS NATIONAL MONUMENT
CR
42
BUREAU OF LAND MANAGEMENT NATIONAL CONSERVATION AREA BOUNDARY

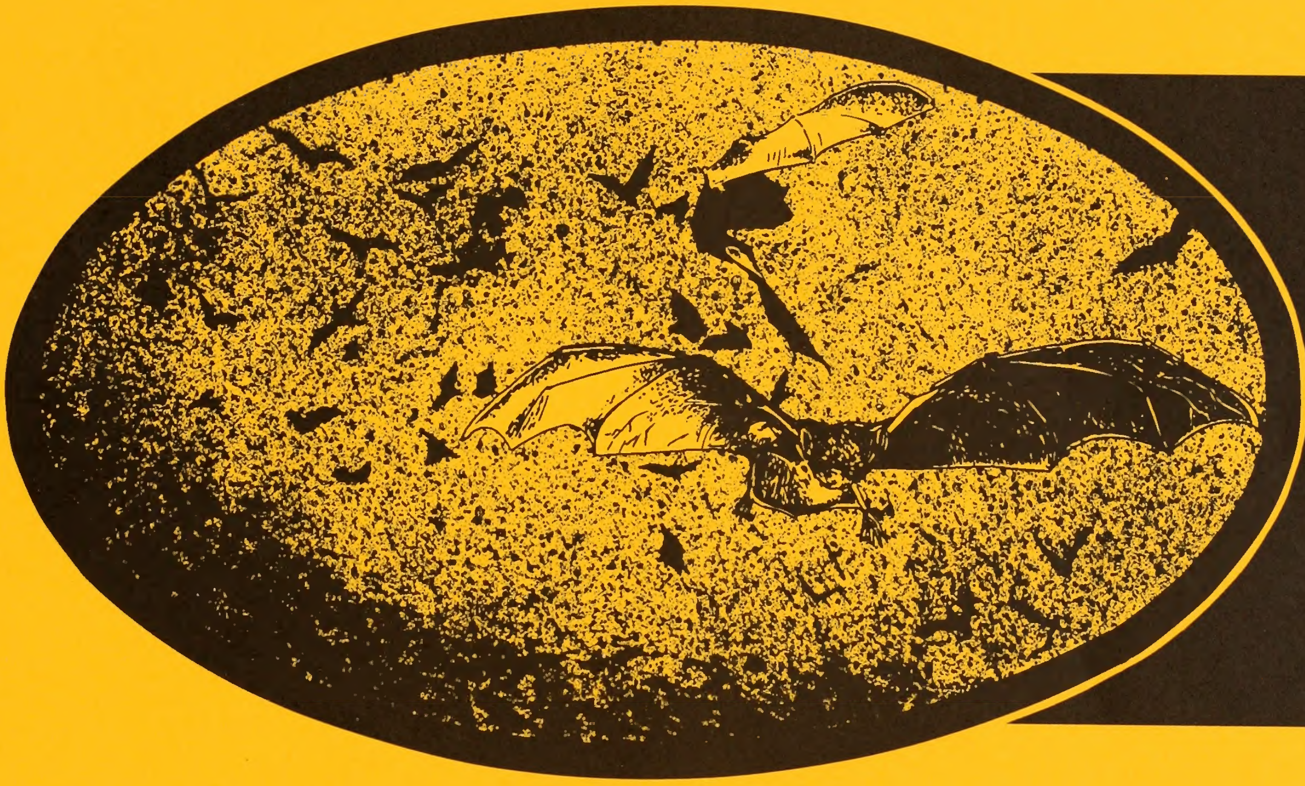
Regional Planning Stage (Draft GMP)

Definitive Criteria:	Terrain/Landform, Soils, Vegetation/Landcover, Surface Water/Drainage
Delineates:	The core elements of the ecotype that have predictable behavior patterns
Mapping and Analysis Scale:	100 Meters
Use:	Regional planning for resource allocation

Site Planning Stage (Final GMP)

Definitive Criteria:	Terrain/Landform, Soils, Vegetation/Landcover, Surface Water/Drainage
Delineates:	More detailed data about core elements of the ecotype
Analysis Scale:	30 Meters
Use:	Project or site planning

FIGURE 1-1
USES OF BLUS FOR REGIONAL AND SITE PLANNING



CHAPTER 2

Management Summary

Chapter 2
Management Summary

Section 1
Introduction

This chapter summarizes the management program for the El Malpais National Conservation Area (NCA). It includes discussions of the El Malpais legislation and its emphasis, existing management of the NCA (including management guidance, key actions completed and planned, and staffing), proposed changes to the NCA boundary, public involvement and issues, BLM goals for managing the NCA, and the proposed NCA management plan and an alternative.

The legislative emphasis for the NCA is on conservation. Many of the proposed actions in this GMP would directly implement three of the BLM's key initiatives for multiple-use program management. These initiatives include "Recreation 2000," "Wildlife 2000," and "Adventures in the Past." A strong emphasis is also placed on interpretation and education services, establishing research opportunities, and effective monitoring of natural resource conditions. Many actions would be implemented by maintaining existing partnerships and establishing new ones with tribal, private, state, and other federal entities.

Section 2
The El Malpais Legislation

The El Malpais legislation (PL 100-225), Sections 301 and 302, states: "In order to protect for the benefit and enjoyment of future generations that area in western New Mexico containing the La Ventana Natural Arch and other unique and nationally important geological, archeological, ecological, cultural, scenic, scientific, and wilderness resources of the public lands surrounding the Grants Lava Flows, . . . the Secretary, acting through the Director of the Bureau of Land Management, shall manage the conservation area to protect the resources specified in Section 301. . . ." (note: Appendix A contains a summary of the El Malpais legislation and the Congressional record related to it.)

The mission of this GMP is to implement the overall intent of Congress as summarized in this legislative statement of philosophy. All management goals, objectives, prescriptions, and actions described in the GMP are consistent with this philosophy. Because all site-specific actions needed to effectively manage the NCA cannot be anticipated, the GMP provides a reference point on legislative intent for future management decisions about the NCA.

Chapters 3 through 6 of this GMP are plans for managing each of the four separate management units set up by the legislation to make up the NCA, including two wilderness units. Each plan contains discussions of management proposals for all resource issues important in that management unit.

In addition to wilderness plans, the El Malpais legislation requires the BLM to include in the GMP plans for interpretation and education, public facilities, wildlife resources, natural resources, and cultural resources. These plans are contained in Chapters 9 through 13. (Note: Chapters 7 and 8 will contain information on implementation and monitoring, and are deferred to the Final GMP.)

Section 3
Existing Management

MANAGEMENT GUIDANCE

Existing management of the El Malpais NCA is primarily guided by the Rio Puerco Resource Management Plan (RMP; USDI, BLM), which was finalized in 1986 (refer to Appendix C for a discussion of the RMP). Guidance for NCA management is also found in the El Malpais legislation, the BLM Interim Management Policy for Lands Under Wilderness Review, the BLM Wilderness Management Policy, and the Federal Land Policy and Management Act of 1976 (FLPMA).

The RMP established the El Malpais Special Management Area, acknowledging El Malpais as a part of the Rio Puerco Resource Area containing important natural, cultural, scientific, recreational, and scenic values. The El Malpais legislation amended the RMP in 1987. This General Management Plan (GMP) is an activity plan that implements the El Malpais legislation.

The RMP recommended consolidating the federal estate (surface and subsurface minerals) within what is now the El Malpais National Monument and the NCA. Approximately 48,200 acres of private lands exist in the NCA. The program of land and mineral acquisition initiated by the RMP continues as part of this GMP. Acquisition plans and priorities for the properties within the boundary of the NCA are further defined and outlined in the BLM Land Protection Plan (refer to Appendix B for a synopsis).

An item not specifically mentioned in the El Malpais legislation but identified in the Rio Puerco RMP is the route for the Continental Divide National Scenic Trail. Because the trail route identified in this GMP is different than the route identified in the RMP, the GMP proposes to amend the RMP for this item only. (Refer to the Recreation section of Chapter 3 for further discussion on trails.)

KEY ACTIONS COMPLETED AND INITIATED

The El Malpais legislation contains specific directives for the BLM. Table 2-1 lists the key actions mandated by the legislation and other BLM policy. Some of these actions have already been completed, while others are just being initiated.

TABLE 2-1
KEY ACTIONS COMPLETED AND INITIATED IN THE EL MALPAIS NCA

Action	Completion Date	Estimated Cost
Development of Ranger Station		
Complete site planning, environmental assessment, and preliminary engineering	12/31/89	$ 25,000
Complete design and contract for construction of facility and parking lot	09/30/90	552,000
Furnish facility, including interpretive displays	09/30/91	558,000
Curb, gutter, and pave parking lot; landscape and rehabilitate	09/30/91	(286,000)
Construct interpretive trail and install signs	09/30/91	(46,000)
Furnish facility, including exhibits and displays	09/30/91	(226,000)
Development of La Ventana Parking Lot and Trail		
Complete parking lot construction, trail construction, and fence installation	09/30/89	35,000
Install interpretive display	05/30/90	6,000
Install vault toilets, complete curb and gutter, pave parking lot and handicapped-accessible trail. (Completion date is dependent on NM Hwy Dept. To realize significant cost savings, this project will be scheduled w/Hwy Dept's plan for realigning portions of NM 117.)	09/30/91	157,000
Cultural Resources Inventory		
Complete Class II inventory on 46,130 acres	06/30/90	80,000
Complete Class III inventory of Cebolla Canyon Complex (480 acres)	09/30/91	24,000
Complete 5% Class II inventory of Cerritos de Jaspe subunit (12,800 acres)	09/30/91	32,000
Complete stabilization maintenance at Dittert Site	09/30/91	20,000
Completion of Land Exchanges		
Acquire 38,335 acres of subsurface	09/30/89	1,000,000
Acquire 12,176 acres of surface, 62,231 acres of subsurface	09/30/90	1,250,000
Acquire 5,000 acres of surface, 15,000 acres of subsurface	09/30/91	1,000,000
Opening of El Malpais Information Center		
Open temporary information center with National Park Service in Grants, NM	07/02/88	55,000

STAFFING

On July 2, 1988, the BLM and the NPS opened a field station in Grants staffed with personnel to provide a local presence. Field personnel from the BLM offices in Grants monitor and patrol the NCA. One BLM law enforcement officer is stationed in Grants.

According to projections, visitation to the National Conservation Area will increase steadily through the year 2000. The BLM will require additional staff to protect resources, maintain facilities, and offer visitor services at both the Ranger Station and the Multi-agency Center on Interstate 40. Tables 2-2 and 2-3 summarize current authorized staffing levels and proposed staffing requirements.

TABLE 2-2
CURRENT AUTHORIZED BLM STAFF AT EL MALPAIS INFORMATION CENTER, GRANTS, NM

Position	Grade	Salary (1989 $)	FTE*
Supervisory Multi-Resource Specialist	GS-11	$ 28,852	1.0
Visitor Information Specialist	GS-5	18,888	1.0
Visitor Information Specialist	GS-5	15,738	1.0
Support Services Specialist (Vacant)	GS-5	15,738	1.0
Authorized Annual Total		$ 79,216	4.0

Note: * FTE = Full-Time Equivalent position.

TABLE 2-3
BLM STAFFING REQUIREMENTS UNDER THE PREFERRED ALTERNATIVE

Position	Grade	Salary (1989 $)	FTE*
Supervisory Multi-Resource Specialist	GS-11	$ 28,852	1.0
Visitor Information Specialist	GS-7/9	23,846	1.0
Visitor Information Specialist	GS-7/9	23,846	1.0
Visitor Information Specialist (Ranger Station)	GS-5/7	19,493	1.0
Support Services Specialist	GS-6	17,542	1.0
Clerk-Typist	GS-4	14,067	1.0
Maintenance Worker	WG-7/8	25,178	1.0
Maintenance Worker (Seasonal)	WG-03	4,656	0.3
Natural Resource Specialist (Range/Wildlife/Forestry)	GS-9	23,846	1.0
Park Ranger (Seasonal)	GS-4	4,221	0.3
Park Ranger (Seasonal)	GS-4	4,221	0.3
Law Enforcement Ranger	GS-5/7	19,493	1.0
Law Enforcement Ranger	GS-5/7	19,493	1.0
Proposed Total		$ 228,754	10.9
Total Increase over Current Authorized Staff		$ 149,538	6.9

Note: * FTE = Full-Time Equivalent position.

Section 4
Proposed Expansion of the NCA Boundary

This GMP recommends five new parcels of land, both public and private, for inclusion within NCA boundaries, with the private parcels being recommended for acquisition. This boundary adjustment would require Congress to amend the El Malpais legislation, and would add approximately 32,100 acres to the NCA (refer to Map 2-l).

Two of these parcels would add large, contiguous areas of public land that contain key natural and cultural values that should be managed as part of the NCA. The third addition is suggested to include a major archeological site that has strong interpretive potential. The fourth proposed addition would provide access and a staging area for the Cebolla Wilderness Unit and the fifth would secure a treadway for the BLM's proposed route for the Continental Divide National Scenic Trail, ensuring that it receives more intensive management.

The first parcel, the Techado Mesa area, includes approximately 18,000 contiguous acres of public land that adjoin the southeastern edge of the NCA. This scenic area contains rolling topography and a high, steep-sided mesa capped by lava flows. Vegetation is dominated by mixed conifer and pinon-juniper woodland. Small playa lakes form seasonally on the mesa top. Visually and ecologically the area is similar to adjacent portions of the Brazo subunit and the Cebolla Wilderness Unit.

The Techado Mesa area is isolated from other public lands in the BLM Socorro Resource Area and is thus recommended in the Socorro RMP (USDI, BLM 1988b) for disposal. However, this area directly adjoins the NCA; if managed as part of the Conservation Unit, it would enhance opportunities for semi-primitive motorized recreation and would augment both wildlife and watershed management.

The second parcel, the Tank Canyon area, includes approximately 12,000 contiguous acres of public land adjoining the southwestern edge of the Cebolla Wilderness Unit. Like the Techado Mesa area, this parcel was slated for disposal in the Socorro RMP because it is isolated from other BLM-administered lands in the Socorro Resource Area. However, the Tank Canyon area directly adjoins the NCA and is a logical extension of the NCA lands. It includes natural values and extremely important cultural resources that should be retained in public ownership and managed as part of the Conservation Unit.

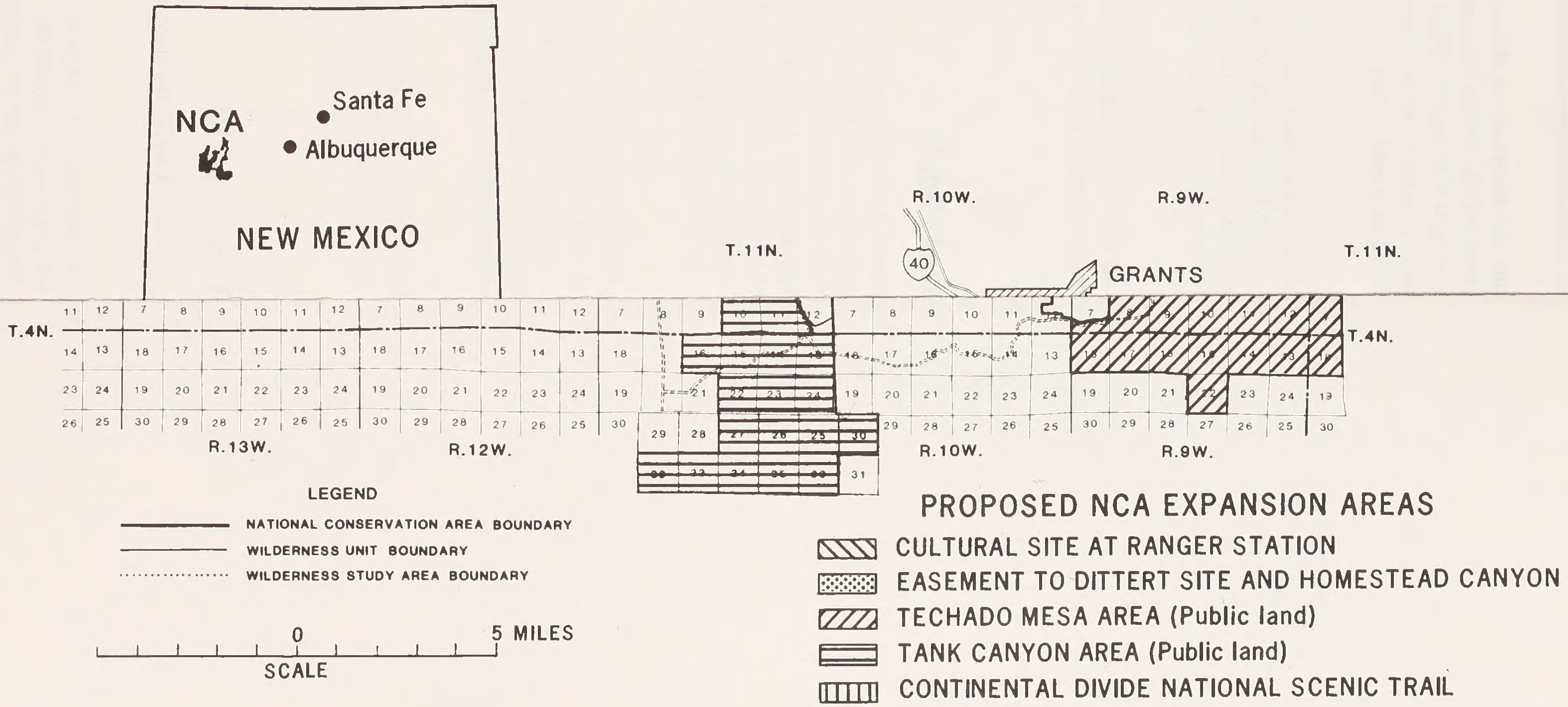
The Tank Canyon area includes high densities of archeological sites that warrant intensive management. Among these is the Newton Site, a large, late masonry pueblo that is among the most important cultural resources in the region. A brief reconnaissance survey of a single section in the Tank Canyon area yielded evidence of 12 masonry pueblos, suggesting that it is an area with one of the highest densities of pueblo sites in the region. These ruins are an extension of a prehistoric community that lies partially within the NCA to the north. The Tank Canyon area also includes well-preserved historic homesteads that were once part of a large, loose-knit community in the El Malpais region.

Most of the headwaters of Tank Canyon are contained in a scenic area of rolling topography. Vegetation is dominated by pinon and juniper, while wildlife values are similar to those in the Cebolla Wilderness Unit.

Addition of the Tank Canyon area to the NCA as part of the Conservation Unit would facilitate management of cultural resources, wildlife, and watershed. This addition would also contribute more opportunities for semi-primitive non-motorized recreation in the NCA.

The third area that should be added to the NCA as part of the Conservation Unit is 640 acres (one section) of private land adjacent to the BLM Ranger Station. The section includes key elements of the prehistoric La Ventana community, such as a great kiva and a large, late prehistoric pueblo. These elements are especially important because they are near the Ranger Station and are ideal for incorporation into interpretive and public education programs based at the station. The parcel is surrounded on three sides by NCA lands and its acquisition would enhance pedestrian access into portions of the NCA.

The fourth area that should be added to the NCA is a 1,460-acre strip of private land along the western edge of the Cebolla Wilderness Unit. These lands are needed to provide a staging area for wilderness-based recreation activities, to provide a buffer of NCA lands between the wilderness and adjacent


NCA
Santa Fe
Albuquerque
NEW MEXICO
R.10W.
R.9W.
T.11N.
40
GRANTS
T.11N.
T.4N.
T.4N.
R.13W.
R.12W.
R.10W.
R.9W.
LEGEND
NATIONAL CONSERVATION AREA BOUNDARY
WILDERNESS UNIT BOUNDARY
WILDERNESS STUDY AREA BOUNDARY
0
5 MILES
SCALE
PROPOSED NCA EXPANSION AREAS
CULTURAL SITE AT RANGER STATION
EASEMENT TO DITTERT SITE AND HOMESTEAD CANYON
TECHADO MESA AREA (Public land)
TANK CANYON AREA (Public land)
CONTINENTAL DIVIDE NATIONAL SCENIC TRAIL

MAP 2-1

PROPOSED EXPANSIONS OF THE EL MALPAIS NCA BOUNDARY FOR RESOURCE PROTECTION AND FACILITY DEVELOPMENT

Section 4
Proposed Expansion of the NCA Boundary

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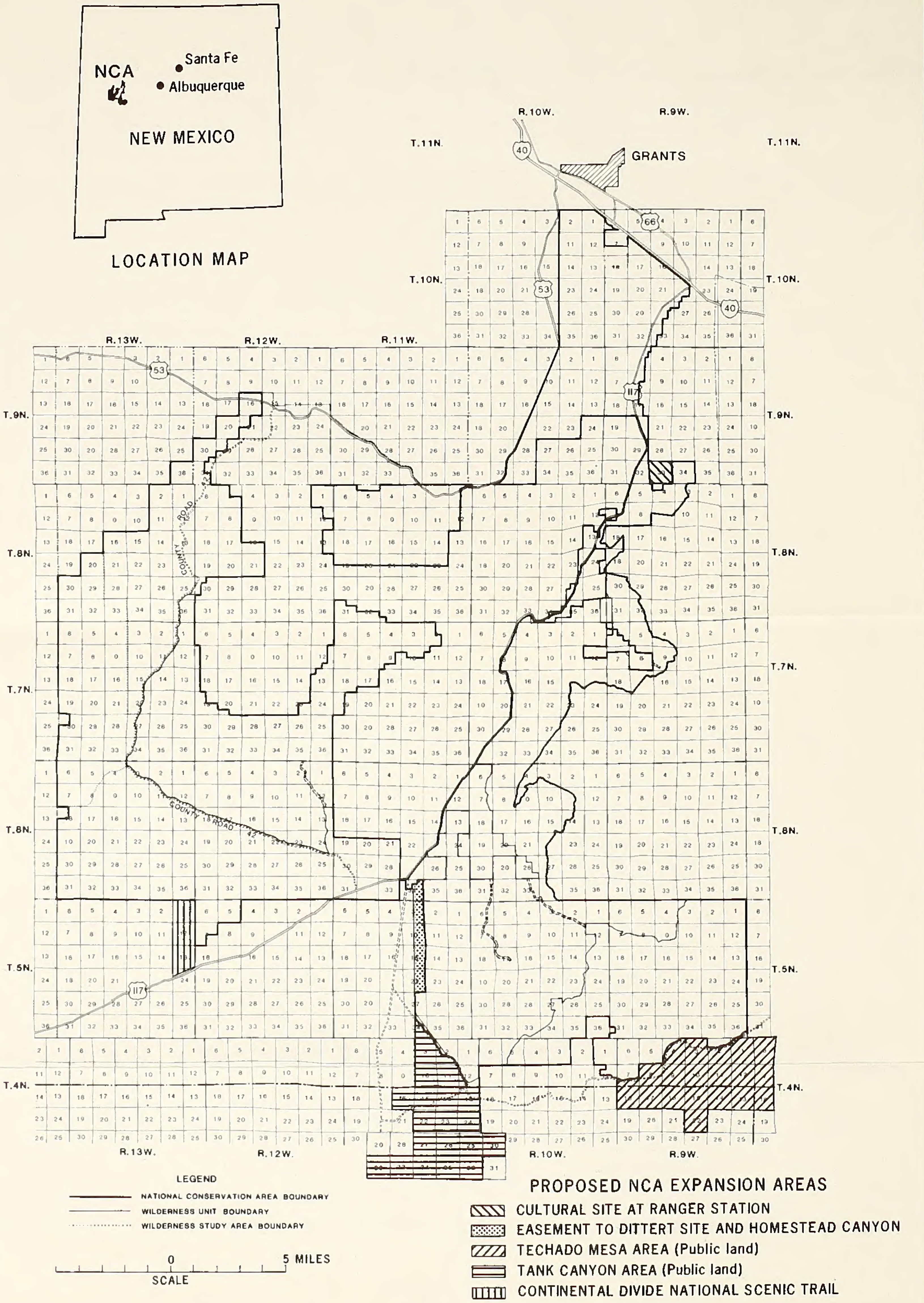

NCA
Santa Fe
Albuquerque
NEW MEXICO
LOCATION MAP
GRANTS
R.13W.
R.12W.
R.11W.
R.10W.
R.9W.
T.11N.
T.10N.
T.9N.
T.8N.
T.7N.
T.6N.
T.5N.
T.4N.
40
66
53
117
COUNTY ROAD 42
N
LEGEND
NATIONAL CONSERVATION AREA BOUNDARY
WILDERNESS UNIT BOUNDARY
WILDERNESS STUDY AREA BOUNDARY
0
5 MILES
SCALE
PROPOSED NCA EXPANSION AREAS
▧ CULTURAL SITE AT RANGER STATION
▒ EASEMENT TO DITTERT SITE AND HOMESTEAD CANYON
▨ TECHADO MESA AREA (Public land)
▤ TANK CANYON AREA (Public land)
▥ CONTINENTAL DIVIDE NATIONAL SCENIC TRAIL

MAP 2-1

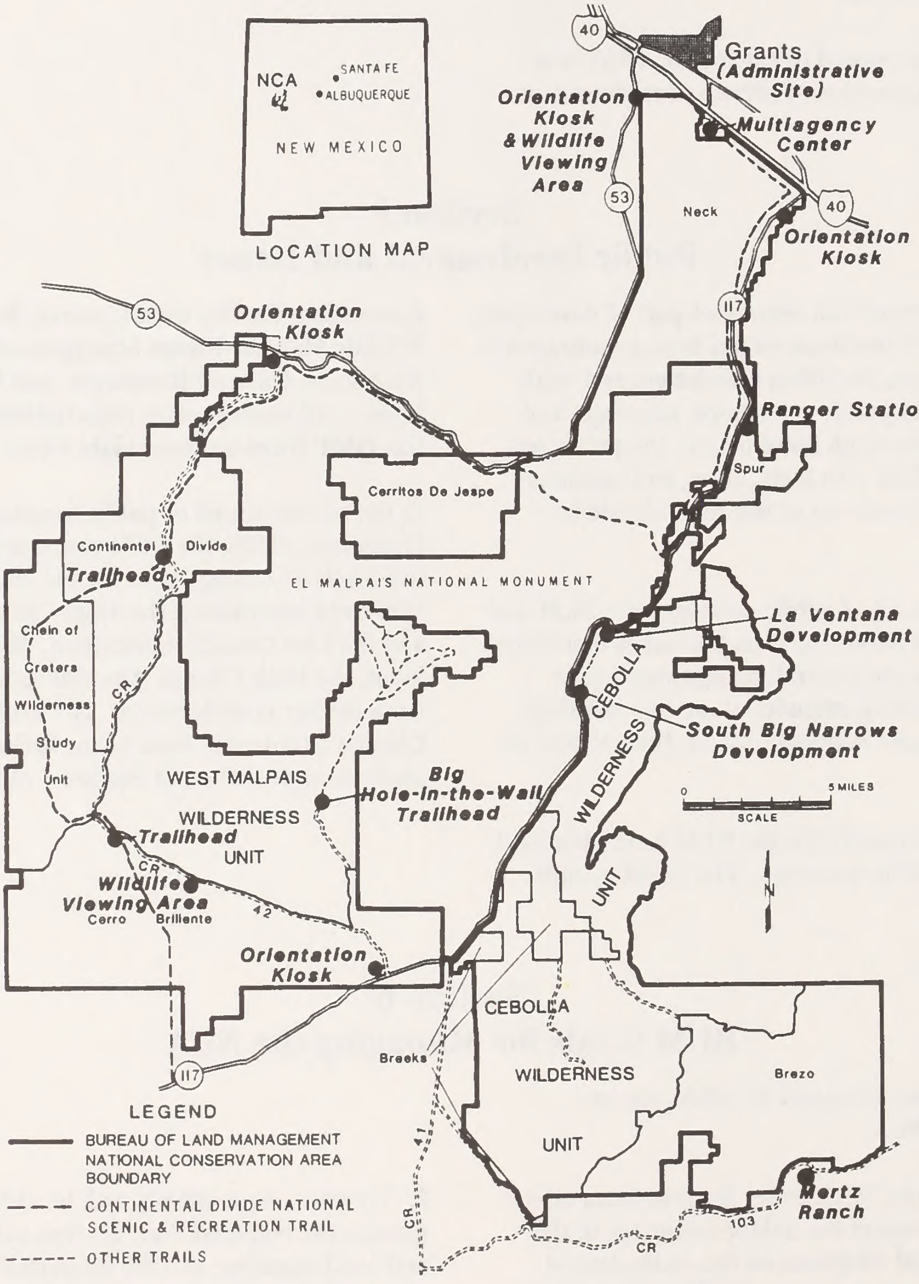
PROPOSED EXPANSIONS OF THE EL MALPAIS NCA BOUNDARY FOR RESOURCE PROTECTION AND FACILITY DEVELOPMENT

Section 7
The Proposed Plan and Alternative

SUMMARY OF PROPOSED ACTIONS AND FACILITIES (PREFERRED ALTERNATIVE)

Table 2-4 summarizes the management actions being proposed in this GMP for the El Malpais National Conservation Area, and Map 2-2 shows the location of proposed and existing facilities. The table also lists the resource issues related to each action.

The column labeled "Implementation Phase" in Table 2-4 indicates the order in which the actions are likely to be implemented. Phase I actions will be implemented first, Phase II actions next, and Phase III actions last.



MAP 2-2
PROPOSED BLM DEVELOPMENTS IN THE EL MALPAIS NCA

TABLE 2-4
SUMMARY OF BLM PROPOSED ACTIONS IN THE EL MALPAIS NCA

Proposed Action	Related Resource Issue(s)	Implementation Phase
Construct Facilities		
Construct additional recreational facilities at La Ventana Natural Arch, including interpretive panel, curbs & gutters at existing parking area, & upgrade of existing trail; install visitor counter along existing trail	Recreation	I
Construct BLM Ranger Station along NM 117 northeast of Sandstone Bluffs Overlook to provide parking, visitor information/reception area, exhibits, sales area, housing for seasonal employees/volunteers, & radio communications facility	Recreation, Wilderness, Cult. Res., Wildlife, Range Mgmt.	I
Develop safe drinking water at selected sites	Recreation	I
Construct four orientation kiosks at CU entrance points	Recreation	II
Construct recreation facilities at Dittert Site; upgrade access after cultural resources mitigation; provide graveled parking lot for 6-8 vehicles; build trailhead & approximately 1/4-mile trail to site	Recreation, Cultural Resources	II
Build trail to access West Malpais Wilderness using existing vehicular ways w/trailheads, gravel parking lot, & equestrian facilities at end of cherry-stemmed road	Recreation, Wilderness	II
Provide additional wildlife waters in CU	Wildlife	II
Construct recreation facilities at South Big Narrows to provide graveled parking lot for 6-8 vehicles, 6-table picnic area for day use, trailhead to Cebolla Wilderness, vault toilets, & primitive 4-mile rim trail into Cebolla Wilderness	Recreation	II
Provide all-weather access to homestead, graveled parking lot for 6-8 vehicles, trailhead, & interpretive trail	Recreation	III
Build two trailheads in CU to access Continental Divide National Scenic Trail; construct graveled parking lots at trailheads; provide for equestrian use at southern trailhead	Recreation	III
Provide pullout for high desert ecosystem interpretation & viewing along CR 42	Recreation, Wildlife	III
Establish & Maintain Partnerships		
Continue partnerships w/cities of Grants & Milan in effective management of NCA	All	I
Continue existing MOU w/NM Museum of Natural History in public outreach, cultural resource education, & interpretation	All	I
Encourage partnerships w/UNM & other colleges & universities for collection & analysis of natural resource data	All	I
Continue existing cooperative agreements w/UNM for collection & development of natural resource data	All	I
Continue existing cooperative agreement w/USDA-FS for natural resource data sharing	All	I
Maintain full cooperation w/NPS in development, construction, & operation of Multiagency Center near Grants, NM	All	I

TABLE 2-4
SUMMARY OF BLM PROPOSED ACTIONS IN THE EL MALPAIS NCA

Proposed Action	Related Resource Issue(s)	Implementation Phase
Maintain administrative office w/NPS in Grants, NM, to more effectively identify non-essential roadways, develop mutual patrol & maintenance schedules, & review fire plans & plans for design & construction of facilities in CU	All	I
Maintain liaison w/NMDG&F in managing hunting	Wildlife, Recreation	I
Continue liaison & consultation process w/interested local Indian tribes	Native American Concerns	I
Encourage allottees to enter into co-operative agreements w/SCS to develop erosion control plans on private land in CU	Range Mgmt, Wildlife, Natural Resources	I
Maintain hunter patrols (Operation Respect) during hunting seasons	Recreation, Range Mgmt	I
Identify sites appropriate for addition to Masau Trail in cooperation w/NPS	Cultural Resources	I
Develop new alignment of NM 117 in cooperation w/NM Highway Dept.	Recreation	I
Conduct cooperative feasibility studies w/NMDG&F for reintroduction of bighorn sheep	Wildlife	II
Develop cooperative search-&-rescue plans w/NM State Police	Recreation	II
Develop cooperative agreement &/or MOU w/Pueblo of Acoma & NPS to provide additional recreation opportunity at Calabash Ruins/Kowina Foundation, as part of Masau Trail	Recreation, Cult. Res., Native American Concerns	II
Recommend Expanded CU Boundary		
Expand CU to include contiguous lands w/important natural & cultural resources &/or easements for access, including Techado Mesa area, Tank Canyon area, Dittert Site, cultural site adjacent to Ranger Station, & area proposed for treadway of Continental Divide National Scenic Trail	Recreation, Cultural Resources, Wilderness, Wildlife	I
Acquire		
Acquire legal access to mouth of Cebolla Canyon	Recreation	I
Acquire easements and private land to access Dittert Site	Recreation, Cult. Res.	I
Acquire threatened cultural properties such as Pinole Site & Cerritos de Jaspe Community	Cultural Resources	I
Acquire scenic easements on main access routes to CU, including on NM 53, CR 42, and NM 117 corridors	Recreation	I
Acquire adequate legal water rights in CU through application to State Engineer	Recreation	I
Acquire Mertz Ranch or other appropriate facility to use as base for Field Learning Center	All	II
Acquire private land to construct kiosk along NM 53 & provide watchable wildlife viewing area in wetlands	Recreation, Wildlife	II
Acquire private lands contiguous w/CU that contain wetland habitat	Wildlife, Nat'l Res.	II
Acquire easements &/or property where Continental Divide National Scenic Trail crosses private land	Recreation	III

TABLE 2-4
SUMMARY OF BLM PROPOSED ACTIONS IN THE EL MALPAIS NCA

Proposed Action	Related Resource Issue(s)	Implementation Phase
Acquire legal access &/or selected private land in Cerritos de Jaspe	Recreation	III
Establish Onsite Interpretive & Educational Programs		
La Ventana *Develop interpretive panel *Conduct special tours & programs	Recreation	I
Orientation Kiosks *Distribute information on points of interest, facilities available, safety, activities, & events in CU	Recreation	I
Dittert Site *Post interpretive information at trailhead about cultural resources, human use of NCA region, wilderness, low-impact visitor use, & safety *Develop site bulletin *Conduct special tours & programs	Recreation, Cultural Resources, Wilderness	II
West Malpais Wilderness Trailhead *Develop & post trailhead information about wilderness, low-impact visitor use, & safety	Recreation, Wilderness	I
High Desert Ecosystem Interpretive Area on CR 42 *Post interpretive panel highlighting natural resources, wildlife, landscape, geology, & landforms	Recreation	II
South Big Narrows *Develop & post trailhead information about wilderness, low-impact visitor use, & safety	Recreation, Wilderness	II
Historic Homestead *Post interpretive information at trailhead that highlights history of homesteading in area & human use of land *Develop site bulletin *Conduct special tours & programs	Recreation, Cultural Resources	III
Continental Divide National Scenic Trail *Distribute interpretive information for Continental Divide National Scenic Trail at two trailheads highlighting natural resources, cultural-historic resources, safety, and low-impact visitor use	Recreation	III
Establish Offsite Interpretive & Educational Programs		
Establish public education program at BLM Ranger Station to include natural & cultural resource exhibits, audio-visual programs, & interpretive trails; written information including maps, brochures, & books; ranger talks & guided hikes; & safety information	All	I
Establish cultural & natural resource programs to include environmental education presentations in schools & communities	All	I
Inform visitors of health threat from using surface waters, impacts of camping near surface waters, & existence of & need for respect for privately owned water sources	Recreation	I
Inform visitors of importance of wildlife snags (trees), disturbance caused by human & wildlife interaction, & importance of wetlands to wildlife	Recreation, Wildlife	I

TABLE 2-4
SUMMARY OF BLM PROPOSED ACTIONS IN THE EL MALPAIS NCA

Proposed Action	Related Resource Issue(s)	Implementation Phase
Inform visitors of significance of geologic, physical, & vegetative resources	Recreation, Natural Resources	I
Inform visitors of importance of maintaining & protecting fences, waters, gates, and other range improvements	Recreation, Range Management	I
Monitor Natural Resources & Visitor Experience		
Implement Limits of Acceptable Change (LAC) monitoring system (refer to Appendix J)	All	I
Monitor visitor use patterns, numbers, & perceptions at La Ventana Natural Arch by providing traffic counter in parking lot, installing visitor counter on trail, & instituting patrol & maintenance program	Recreation, Wilderness, Cultural Resources	I
Monitor visitor use patterns, numbers, & perceptions at Dittert Site by providing for self-registration at trailhead & instituting patrol & maintenance program	Recreation, Wilderness, Cultural Resources	I
Monitor visitor use patterns, numbers, & perceptions at South Big Narrows by installing traffic counter, providing for self-registration at trailhead, & instituting patrol & maintenance program	Recreation, Wilderness, Cultural Resources	I
Monitor threatened sites through systematic photodocumentation of change in site condition	Cultural Resources, Recreation	I
Monitor illegal activities by establishing more frequent patrols	Cultural Resources	I
Monitor effects of recreation use on cultural resources through long-term studies at developed recreation sites	Cultural Resources, Recreation	I
Monitor maintenance needs at existing wildlife waters	Wildlife	I
Monitor water quality at Ranger Station	Nat'l Res., Recreation	I
Monitor key areas in each grazing allotment for range condition	Range Mgt., Wildlife	I
Monitor impact of recreation use on natural resources	All	I
Monitor changes in natural resources from natural & human causes	All	I
Monitor habitat condition & trend on key wildlife use areas	Wildlife	II
Monitor water quality at natural springs	Wildlife, Recreation	III
Monitor visitor use patterns, numbers, & perceptions at trailheads for Continental Divide Natural Scenic Trail by providing self-registration at trailheads & instituting patrol & maintenance program	Recreation	III
Monitor areas where soil is sensitive & susceptible to high erosion	Nat'l Res., Recreation	III
Develop Resource Site Plans		
Develop & implement AMPs to improve forage for range & wildlife, reduce erosion, protect sensitive wetland habitat, & maintain livestock waters	Range Mgmt, Wildlife, Natural Resources	I
Develop & implement plan for fire management that allows for controlled fuelwood reduction through home use sales & controlled burns in areas of high fuel build-up. Plan would establish zones for fire suppression & allowable burn to maintain or enhance wildlife habitat and rehabilitate watershed. Objectives would be tailored to wilderness management criteria in designated wilderness.	All	I

TABLE 2-4
SUMMARY OF BLM PROPOSED ACTIONS IN THE EL MALPAIS NCA

Proposed Action	Related Resource Issue(s)	Implementation Phase
Develop & implement plan to control erosion in areas w/high erosion rates by reseeding native or endemic species, & maintaining existing erosion control structures in areas w/high erosion potential	All	II
Develop & implement plan to protect riparian habitat (wetland areas)	All	II
Develop & implement plan to stabilize threatened cultural sites	All	II
Implement Mitigating Measures		
Train staff in techniques to repair, stabilize, & preserve cultural resources	Cultural Resources	I
Train law enforcement & other key personnel in working w/Native American values & concerns	Native American Concerns	I
Train law enforcement & other key personnel in ARPA techniques	Cultural Resources	I
Train personnel to implement ARPA public education program, including monetary rewards for information leading to arrest & conviction of violators	Cultural Resources	I
Implement staffing program that includes personnel for Native American law enforcement & language interpretation	Native American Concerns	I
Post antiquities signs in areas of active vandalism of cultural sites	Cultural Resources	I
Follow policy to avoid cultural resources during facility development	Cultural Resources	I
Enforce vehicle restrictions in areas of high cultural site density	Cultural Resources	I
Close areas around Ranger Station, South Big Narrows, & trailheads to grazing, hunting, & trapping	Recreation	I
Place trails so as to direct visitors away from sensitive sites	Recreation, Cult. Res., Nat. Am. Concerns, Wildlife	I
Bring staffing level up to 10.9 FTE for Grants Field Station	All	I,II
Restrict visitor use in wildlife areas during important times of wildlife use	Wildlife, Recreation	II
Establish Research Opportunities		
Promote natural & cultural research w/research & teaching institutes, local Native American groups, & private individuals	All	I
Establish Field Learning Center to facilitate onsite research opportunities	All	I
Compile existing research records on all natural resources	All	I
Complete write-ups from previous cultural resource excavations	Cultural Resources	I
Limit cultural resources research involving collection or excavation to only those sites threatened by natural deterioration &/or vandalism	All	I
Locate existing collections from previous research projects involving cultural resources	All	I

TABLE 2-4
SUMMARY OF BLM PROPOSED ACTIONS IN THE EL MALPAIS NCA

Proposed Action	Related Resource Issue(s)	Implementation Phase
Inventory		
Inventory entire NCA for homesteads (using reconnaissance & oral history) to identify & evaluate sites suitable for interpretation &/or needing special management attention	Cultural Resources, Recreation	I
Inventory to identify areas where severe erosion is occurring & to determine causes	Cult. Res., Wildlife, Recreation, Range Mgt.	I
Identify areas important to wildlife for breeding, migration, cover, birthing, & winter use	Wildlife	I
Identify wildlife habitats, including old-growth forest areas, wildlife snags, playas, wetlands, perennial springs & streams, raptor nesting areas, raptor food supply areas, prairie dog towns, & other burrowing mammal habitat	Wildlife	I
Identify areas along transportation corridors appropriate for viewing wildlife	Recreation, Wildlife	I
Identify areas where woodlands have encroached on wildlife habitat	Wildlife, Recreation	I
Identify locations appropriate for additional wildlife waters (refer to Map 3-5 in Chapter 3)	Wildlife	I
Identify sites containing flammable materials to protect cultural resources by establishing fire suppression zones	Cultural Resources	I
Inventory entire NCA to 5% Class II standard (5,759 acres of new Class III survey) to identify cultural sites threatened by natural deterioration &/or vandalism	Cultural Resources	I
Inventory 520 acres of critical area in NCA to Class III standards (survey at 100%) to identify cultural sites threatened by natural deterioration (erosion/headcutting) &/or human activities	Cultural Resources	I
Identify stands of pinon trees that are producing nuts	Nat. Am. Concerns, Nat'l Res.	I
Identify areas of high fuel build-up	Nat'l Res., Range Mgt., Wildlife	I
Identify areas where undesirable plant communities occur & control methods may be needed	Nat'l Res., Range Mgt., Wildlife	I

Notes: Acronyms used in this table are as follows:

AMP - Allotment Management Plan;
ARPA - Archeological Resources Protection Act;
BLM - Bureau of Land Management;
CR - County Road;
CU - Conservation Unit;
FTE - full-time equivalent position;
MOU - Memorandum of Understanding;
NCA - National Conservation Area;
NM - New Mexico;
NMDG&F - New Mexico Department of Game & Fish;
NPS - National Park Service;
SCS - Soil Conservation Service;
UNM - University of New Mexico;
USDA-FS - U.S. Department of Agriculture, Forest Service.

SUMMARY OF LOW CHANGE ALTERNATIVE

The Low Change Alternative is an alternative to the proposed plan. The Low Change Alternative contains only the minimum changes to the existing environment that would be necessary to meet the intent of the El Malpais legislation. In most cases, the Low Change Alternative is a reflection of existing conditions in the NCA and is a description of how the BLM is managing the NCA before the GMP is approved. In this GMP, the Low Change Alternative is the same as the "No Action" Alternative.

As does the Preferred Alternative, the Low Change Alternative presents management prescriptions for each of the eight planning issues. The following summary describes the management prescriptions under the Low Change Alternative for each of the eight issues.

Recreation

Under the Low Change Alternative, recreation use of the NCA would be accommodated through development only when resource damage is threatened. Public information and education would be provided offsite, without coordinating with research and teaching institutes. Recreation objectives described in the Rio Puerco RMP (USDI, BLM 1986) would be carried out. The Continental Divide National Scenic Trail would be routed down the east side of the NCA rather than the west side route identified in the Preferred Alternative (refer to Map 3-5 in Chapter 3).

Facility Development

Only the facility described in the El Malpais legislation (the BLM Ranger Station) and facilities needed to protect resources would be constructed. Areas threatened by impacts from public use would be closed to visitor access to protect the resources.

Wilderness

Wilderness resources would be protected primarily through indirect methods (e.g., public education, traffic routing) under the Low Change Alternative. The public would be provided information about the wilderness resource through offsite interpretation.

Wildlife Habitat

The management prescriptions developed for the Low Change Alternative emphasize the maintenance of existing habitat enhancement projects. These projects support present wildlife population levels.

Range Management

Under the Low Change Alternative, the BLM would manage forage in its existing condition. Range improvements would be maintained and a minimum number of new improvements would be developed to ensure a continuing supply of water for livestock.

Natural Resources

The Low Change Alternative describes air and water quality monitoring objectives to maintain existing conditions. Geologic features and unique habitat for plants and animals would both be protected, but to a lesser degree than described under the Preferred Alternative.

Cultural Resources

Management prescriptions and actions for cultural resources emphasize long-term protection and interpretation of the archeological and historic properties in the NCA. For cultural resources, the Low Change Alternative minimizes changes in the existing condition of the NCA's cultural resources. Therefore, the Low Change Alternative consists of the strongest, most aggressive management actions to ensure little change in the resources; it places much more emphasis on managing the cultural resources within the NCA, rather than on managing equally important resources outside the NCA.

Native American Issues

In developing the El Malpais legislation, Congress recognized that Native Americans continue to use El Malpais for traditional cultural and religious purposes. For Native American issues, management prescriptions and actions under the Low Change Alternative would be exactly the same as under the Preferred Alternative. Management prescriptions developed for the NCA describe how the BLM will continue to ensure access for traditional Native American cultural and religious practices, ensure privacy and respect for these practices, and foster an atmosphere of communication and cooperation with local Native American groups.

CHAPTER 3

Conservation Unit Management Plan

Chapter 3
Conservation Unit Management Plan

Section l
Introduction

As noted in Chapter l, the Conservation Unit is made up of blocks of non-wilderness lands scattered throughout the NCA. These scattered blocks form subunits of the Conservation Unit, which have been named individually for ease of reference. They include the Spur, the Neck, the Cerritos de Jaspe, the Continental Divide, the Brazo, the Breaks, and the Cerro Brillante. These subunits are shown on Map 3-l. They will be managed under a common management theme though they are not contiguous. The Bureau of Land Management's (BLM's) goals for the NCA have been described in Chapter 2. They guide the proposed management program for the Conservation Unit.

If Congress does not designate the Chain of Craters Wilderness Study Unit as wilderness, the unit will become part of the Conservation Unit and will be managed under the same management program. A complete description of the Chain of Craters Unit and an analysis of alternative ways of managing it are located in Chapter 6.

Section 2
Unique Features of the Conservation Unit

The Conservation Unit contains exceptional scenic values. The views from high peaks and mesas provide vistas of volcanic fields extending for long distances, sandstone bluffs and ridges rising above rugged lava flows, and broad panoramas of open forest and grasslands.

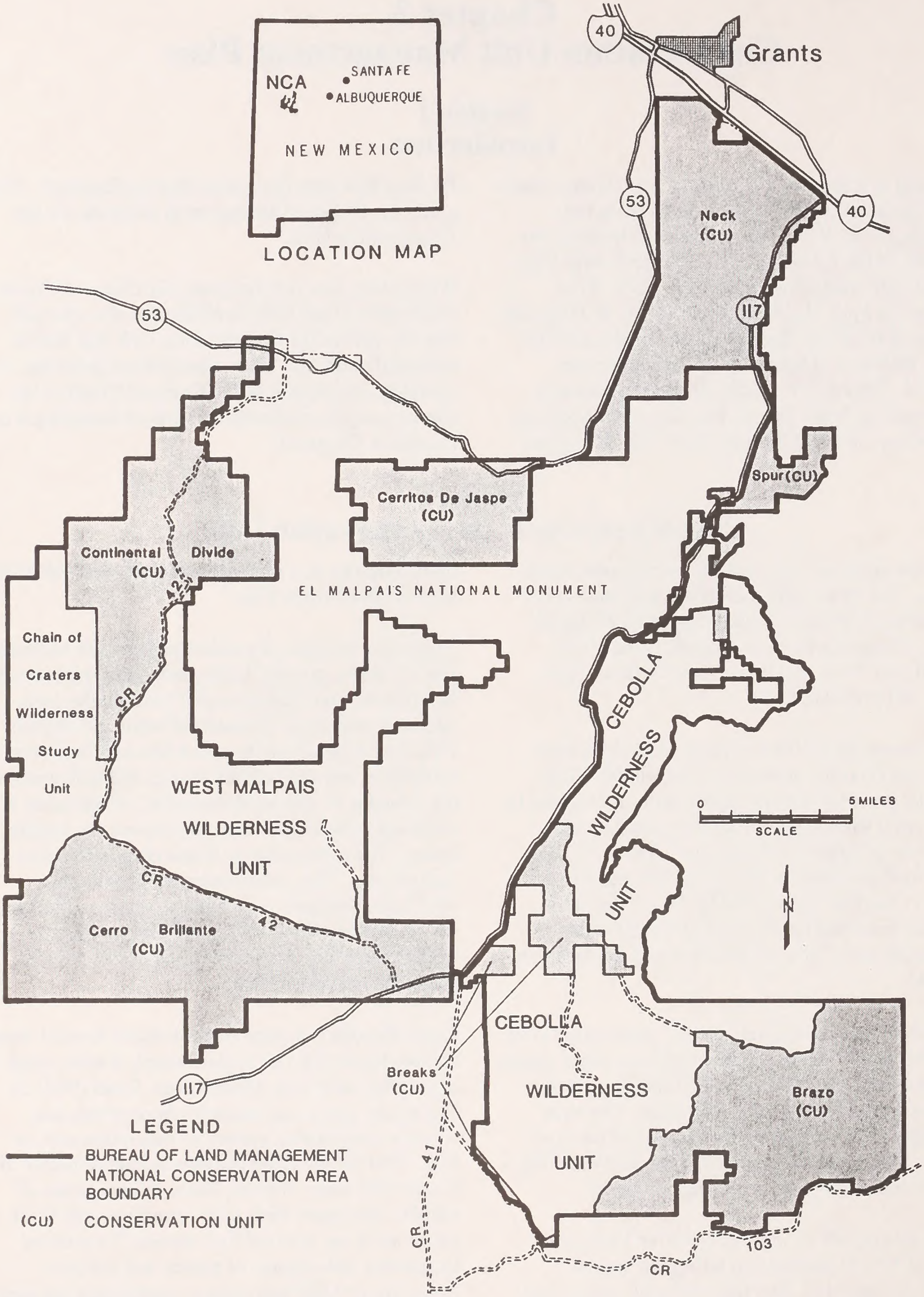
The Conservation Unit is characterized by a wide diversity of terrain, vegetation, and wildlife. This diversity provides unique opportunities for visitors to view varied wildlife within scenic areas that are located in proximity to each other. Table 3-1 contains brief descriptions and quantification of the diverse ecotypes represented in the Conservation Unit, as described by Biophysical Land Units (discussed more fully in Chapter 1 and displayed on Map A).

An ancient lakebed located in the Conservation Unit near the village of San Rafael provides a saline marsh habitat within easy view of NM 53 that is used by a wide variety of birds during migration. The close proximity of this marsh to the highway offers many visitors to the unit an opportunity for bird watching, a recreational activity of increasing popularity.

The northern side of the Conservation Unit just south of NM 53 presents an intriguing broken landscape caused by interspersed bands of lava and sandstone. High ridges and cinder cones offer views into the younger lava flows in the National Monument, the Chain of Craters, and the sandstone bluffs that rise in a rampart along the west side of the Cebolla Wilderness Unit.

Vegetative mosaics of ponderosa pine with understories of shrubs, grasses, forbs, rock outcrops, scattered Douglas fir, and quaking aspen occur in the area, adding strong visual contrasts of color and texture. This area depends on its mixed lava and sandstone formations and their ability to trap and hold water for the Douglas fir and ponderosa pine, which occur at elevations much lower than these trees are usually found. The aspens can be found clustered in lava depressions. The understories of currant, oak, mountain mahogany, raspberries, grasses, wildflowers, and forbs offer a food supply for a variety of wildlife including deer, turkeys, squirrels, coyotes, and many species of birds.

Cerro Rendija is a large shield volcano located along County Road (CR) 42 approximately 6 miles south of its junction with New Mexico State Road (NM) 53. The cinder cones and volcanic plains of this area create a complicated pattern of vegetation and terrain. This combination provides potential habitat for a mule deer herd, coyotes, bears, many species of reptiles, and game birds such as turkeys and doves. Large areas are covered by a mosaic of meadows intermixed with clumps of pinons and junipers. Areas above 7,200 feet support exceptional specimens of alligator bark juniper. The Conservation Unit lies at the northeastern edge of this tree's range.



MAP 3-1
CONSERVATION UNIT

TABLE 3-1
BIOPHYSICAL LAND UNITS IN THE CONSERVATION UNIT

BLU	Description	Total Acres	% of Unit
A	Grass-shrub vegetation on sandy clay loams with low to moderate erosion potential, on 1-10% slopes.	41,301	29
B	Sparse-bare or grass-shrub vegetation on sandy clay loams, in alluvial fans with moderate to high potential for erosion, and l-l0% slopes.	5,693	4
C	Shrub-conifer vegetation on cobbly, gravelly loams over cinders, on hills of 3-50% slope with low to moderate erosion potential.	33,475	24
D	Shrub-conifer vegetation on lava soils, on 1-10% slopes of low to moderate erosion potential.	1,334	1
E	Sparse-bare or grass-shrub vegetation classes over alkaline sandy clay loams, on 1-3% slopes of low to moderate erosion potential.	3,096	2
F	Lava-lichen-shrub, sparse-bare, and grass-shrub complex of vegetation on lava soils, with slopes of l-l2%.	4,255	3
G	Mixed conifer woodland over lava soils, on 1-10% slope of low to moderate erosion potential.	4,576	3
H	Mixed conifer woodland on cobbly, gravelly loams over cinders, on hills of 10-50% slopes with low to moderate erosion potential.	18,434	13
I	Many vegetative classes and soil types of moderate to high erosion potential, on broken and steep terrain, with slopes up to 60%.	18,197	13
J	Many vegetative classes over cobbly clay loams, on very broken terrain of up to 60% slope and low to moderate erosion potential.	6,667	5
K	Ponderosa parkland and deciduous vegetative classes on volcanic and non-volcanic soils and slopes of l-30%.	1,354	1
	Areas with nonconforming land cover.	3,002	2

Note: For further descriptions of the BLUs, refer to Chapter 1.

The southwest portion of the unit, with its wide, rolling landscape of ancient lava flows offers distant views of the Chain of Craters, the sandstone bluffs, and Mount Taylor. A large fault line, La Rendija, forms a crack in the earth more than a mile long and over 30 feet deep. This and other deep fissures within the area's volcanic terrain may contain paleontologic occurrences that show evidence of the plants and animals of the area in the geologic past.

The rolling hills of this southwest region are habitat for pronghorn antelope, and occasional glimpses of these animals are available along CR 42. The uneven topography of the old lava flows creates numerous playa lakes during rainy seasons. These lakes provide breeding grounds for invertebrates and amphibians, and make attractive resting areas for a wide variety of birds, including migratory waterfowl.

The southeastern corner of the Conservation Unit is striking country comprised of sandstone buttes standing in wide grassy valleys. The terrain is very broken and offers an outstanding example of the pinon-juniper breaks that characterize much of the New Mexico landscape. This mixture of habitats, along with the protection afforded by mesa cliffs and canyons, provides an environment for desert bighorn sheep (proposed for reintroduction) mule deer, wild turkeys, and a large variety of wildlife. The cliffs provide nest sites for golden eagles, prairie falcons, and possibly peregrine falcons. On occasion, cougar, elk, and bear have been spotted.

Very small areas of classic ponderosa parkland exist at higher elevations in the Conservation Unit. Ponderosa parkland is characterized by widely spaced large adult (50+ years old) trees in grassy meadows. This habitat offers both a highly scenic landscape to visitors, and an important habitat for Aberts squirrels, tree and hole nesting wildlife, and meadows for young fawns to be weaned in.

The diversity of slope and terrain, the vegetation types, the sandstone and lava that provide the scenic interest to the NCA also provide habitat for over sixty species of birds and make the NCA an excellent area for birders to visit nearly any time of the year. The NCA is located within two days driving distance from three other birding areas that attract birders from around the world, Bosque del Apache Wildlife refuge located in the south central Rio Grande valley, Guadalupe Canyon in extreme southwestern corner of New Mexico, and the Sonoran desert of southeastern Arizona.

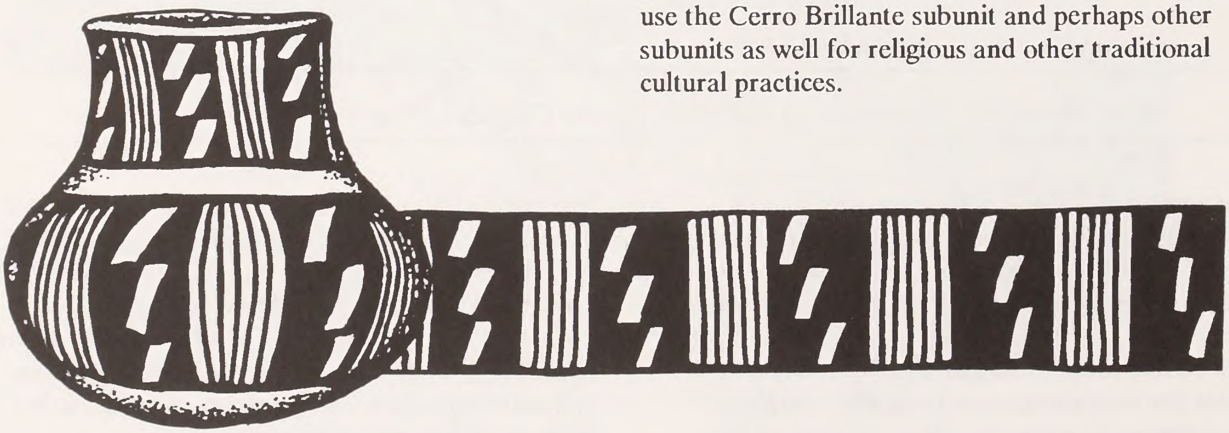
Archeological sites in the Conservation Unit range from 12,000 years ago to historic times in age, but those of the Pueblo II to Pueblo III periods (A.D. 900 to 1300) are most common. Dramatic concentrations of these sites are found in several parts of the unit, including areas near the mouths of drainages coming off Cebollita Mesa. Some are small pueblos characteristic of the early periods, while larger multi-family dwellings remain from later years.

Other unusual prehistoric features in this unit include a large earthen reservoir and a well-constructed footpath (the Zuni-Acoma Trail) across the lava beds. After residences were abandoned by around A.D. 1400, the unit probably continued to be used by Native American peoples for hunting, gathering, and religious purposes.

In addition to prehistoric remains, several historic homesteads have been found in the Conservation Unit. Most of these date between 1920 and 1960, when logging, ranching, and subsistence farming supported a surprisingly large number of people in this region. Many of the homesteads are still standing in various stages of disrepair. They reflect a rural, self-sufficient way of life that is rapidly passing from the American scene.

The entire Conservation Unit lies within areas claimed by the Navajo Tribe and Acoma Pueblo on the basis of aboriginal land use. In addition, portions of the Conservation Unit are claimed by the pueblos of Zuni and Laguna (refer to Map 1-2 in Chapter 1).

The Acomas continue to maintain shrines and sacred places throughout the Conservation Unit, and use the area for other traditional cultural practices such as gathering herbs and hunting. The Ramah Navajos use the Cerro Brillante subunit and perhaps other subunits as well for religious and other traditional cultural practices.



Section 3
Conservation Unit Management Program

INTRODUCTION

This section of the plan discusses the resources that exist in the Conservation Unit, grouped as they pertain to the major planning issues considered in this GMP. The discussion for each issue begins with a statement of the overall management objective for that issue. Also summarized are the current situation, assumptions, and policy applicable to managing each issue.

Each issue has been divided into specific elements of concern to the public and to NCA managers. A table developed for each element outlines management prescriptions and actions tailored to that element.

The "management prescription" describes the conditions to be achieved for each element. The "management action" outlines how that condition will be achieved. The management prescriptions and actions are based upon the existing situation for each element and issue; BLM management philosophy, objectives, and policies for the unit; guidance provided by the public; and the ecological capabilities and limitations of the unit (as described by its Biophysical Land Units).

This plan for managing the Conservation Unit has been developed within a well-defined set of parameters. These parameters result from the El Malpais legislation and its emphases; other laws that apply to the lands and resources in the unit; BLM program policy, guidance, operating procedures, and fiscal constraints; data about the ecotypes, capabilities, and limitations of the unit; public input; and assumptions about how these and other factors may affect management of the unit. All of these parameters taken together provide the framework for analyzing and recommending actions to be taken in managing the Conservation Unit.

RECREATION

Contained within the Conservation Unit are seven subunits (refer to Map 3-l), two principal access corridors, and a proposed corridor for the Congressionally designated Continental Divide National Scenic Trail. Each of these components contains settings that are conducive to a range of recreational pursuits. The landscapes vary widely as do the management requirements for each component. Discussions of each component make up the "Current Situation" section below.

The "Management Prescriptions and Actions" section includes discussions of the various developments and visitor services proposed to maintain or enhance recreation opportunities for the public in the different components of the Conservation Unit. These developments and services include kiosks, trails, and wildlife viewing areas; developments at La Ventana Natural Arch, the South Big Narrows, and the Dittert Site; a proposal for the Mertz Ranch; a Multiagency Center; an administrative center in Grants, New Mexico; and interpretive facilities at an historic homestead.

Management Objectives for Recreation

THE BLM WILL PROVIDE A DIVERSITY OF RESOURCE-DEPENDENT OUTDOOR RECREATION OPPORTUNITIES WHILE MAINTAINING A COMMITMENT TO MANAGE THE CONSERVATION UNIT AS A NATIONAL RESOURCE. MANAGEMENT OF THE UNIT WILL EMPHASIZE RESOURCE PROTECTION, PROMOTE A POSITIVE PUBLIC LAND ETHIC THROUGH INTERPRETATION AND EDUCATION, AND ESTABLISH ACCEPTABLE VISITOR USE LEVELS.

Current Situation

General Information: A variety of developed campgrounds, recreational vehicle camping areas, and motel accommodations exist within the region of the Conservation Unit. The cities of Grants and Milan are actively seeking the economic benefits from the tourism industry to diversify local economies, and are supplying developed facilities for recreational use of the region. Within 80 miles of Grants are 1,150 campsites, including federal, state, and private facilities. The National Park Service (NPS) is proposing to develop a primitive camping area on the west side of the National Monument and the NCA (refer to the East Rendija Area Development Plan in the NPS GMP, 1990). Primitive camping is permitted on most NCA lands.

Natural Settings Available for Recreators: The Conservation Unit exhibits a variety of opportunities for outdoor recreation. This variety is best displayed by examining the ecotypes defined by individual Biophysical Land Units (refer to Map A and Table 3-1). Because one BLM objective is to provide resource-dependent outdoor recreation opportunities, the variety of such opportunities in the Conservation Unit is important.

The Conservation Unit is dominated by four BLUs or ecotypes: A,C,H, and I (refer to Table 3-1). The remaining ecotypes each comprise 5 percent or less of the Conservation Unit. Each BLU presents a slightly different recreational setting, visual setting, and wildlife viewing opportunity. (Refer to Table 1-2 in Chapter 1 for more detail on the natural capabilities and limitations of each BLU for recreation use.)

Current Visitor Use Levels and Patterns: Some information on existing visitor use levels and patterns in the NCA has been collected at the El Malpais Information Center in Grants. Records indicate that visitors come from a variety of places--all over the U.S., Albuquerque and Grants, Europe and other foreign countries. Visitors include commercial truckers who stop on NM 117 to view or photograph La Ventana Natural Arch, vehicle campers, Native Americans, cattle operators, mountain bikers, wilderness users, and other recreators.

Many tourists are just passing by the NCA on I-40, drive through the NCA on NM 53 or NM 117, or stop along the highway rights-of-way. A smaller number take advantage of hiking into the wilderness areas. The fall brings local people (pinon nut pickers, hunters, and trappers) to the area for a period of intensive use.

The Conservation Unit's system of dirt roads offers the opportunity for mountain biking, horseback riding, and high-clearance-vehicle touring. More remote areas of the unit are used for hunting, camping, and hiking. Nature photography and wildlife viewing are popular throughout the unit.

The transportation network in the Conservation Unit includes two-tracks, unimproved and improved dirt roads, and paved two-lane highways (refer to Map B in the map pocket on the back cover of this GMP). The existing network of roads determines how accessible different recreation opportunities are to the visitor.

Recreation Opportunities Available: To evaluate the effect of access on recreation opportunities, the BLM uses a system referred to as the Recreation Opportunity Spectrum (ROS). The ROS system provides a framework for stratifying and defining classes of outdoor recreation environments, activities, and experience opportunities.

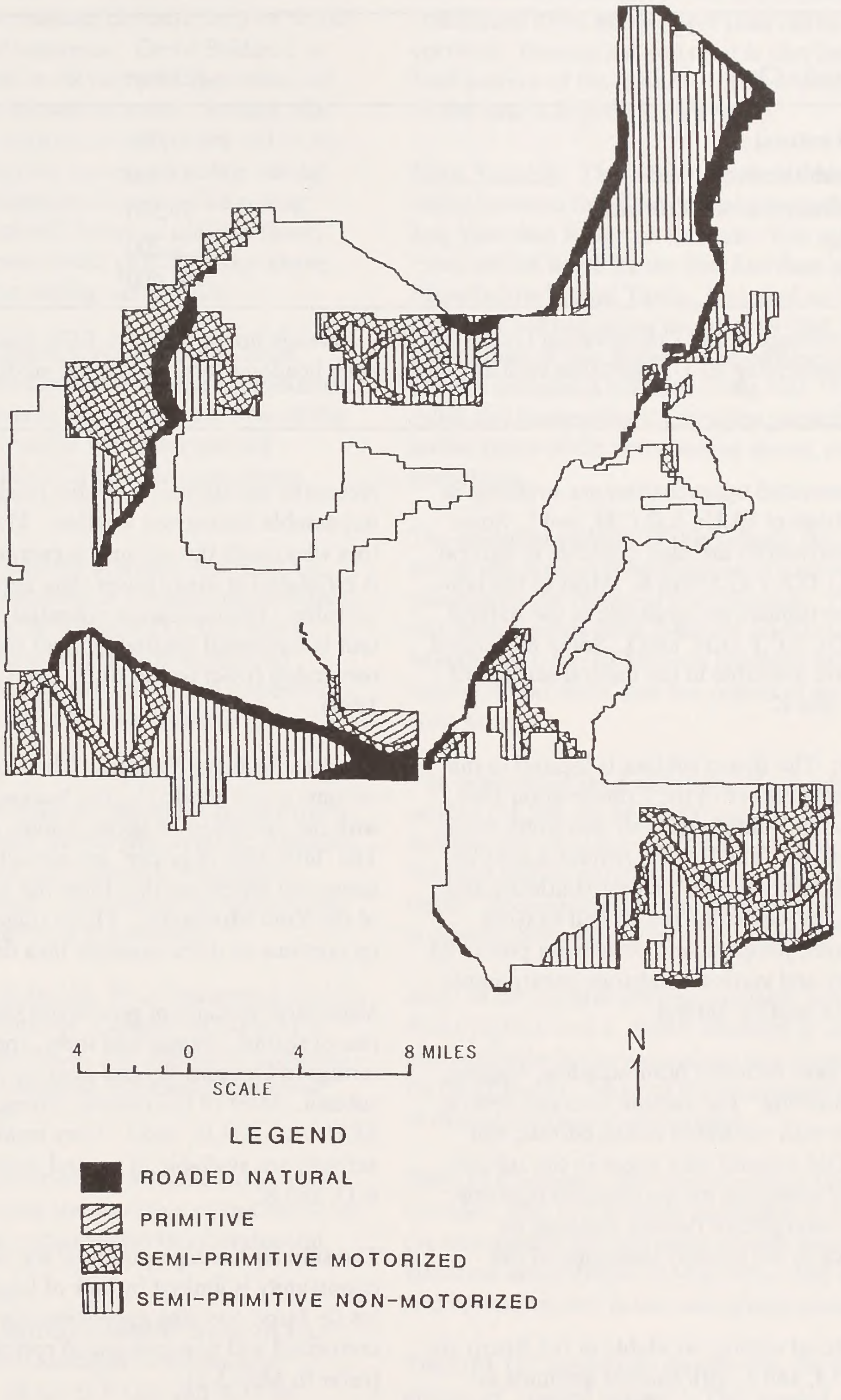
The first stage of the ROS system is an inventory using the existing transportation network. The system uses specific criteria to inventory recreation opportunities and to establish management guidance for each opportunity class (refer to Appendix F for a summary of the ROS system). The opportunity classes include "roaded natural" and "semi-primitive motorized" (for motorized recreation), and "semi-primitive non-motorized" and "primitive" (for non-motorized recreation).

Recreation opportunity classes in the Conservation Unit range from roaded natural to a small amount of primitive. They are listed by acreage in Table 3-2 and shown on Map 3-2. Slightly more non-motorized recreation opportunities are available than motorized.

All BLUs or ecotypes and natural settings are available to some degree to both the motorized and the non-motorized recreator (as classified by the ROS). Within the Conservation Unit, some BLUs have more acreage available for one type of recreation opportunity than for others. The larger BLUs, A and C, have a greater percentage of motorized opportunity available. BLUs H and I provide about the same amount of motorized as non-motorized acreage.

The smaller BLUs, D,E,F, and G, provide recreation opportunities primarily in a non-motorized setting. BLUs J and K have more acreage available to the motorized recreator.

Understanding the differences between BLUs can help the recreator anticipate what natural setting he/she is likely to experience in the Conservation Unit while using motorized or non-motorized modes of transportation (refer to Map 3-2). Understanding the various ecotypes represented by the BLUs can also give the recreator an indication of the recreation features and potential social setting available (refer to Table 1-2 in Chapter 1).



MAP 3-2
RECREATION OPPORTUNITY SPECTRUM IN THE CONSERVATION UNIT

TABLE 3-2
RECREATION OPPORTUNITIES IN THE CONSERVATION UNIT

Opportunity Class	Acreage	% of Unit
Roaded natural	17,900	13
Semi-primitive motorized	41,300	29
Semi-primitive non-motorized	79,500	56
Primitive	2,700	2
TOTAL	141,400*	100

Note: * Total acreage of the Conservation Unit is 141,800. Acreage not included in ROS contains areas with non-conforming BLU vegetation such as playas, ranch headquarters, and highly modified vegetative cover.

Most of the motorized opportunities are available in the natural settings of BLUs A,B,C,H, and I. Some motorized opportunities are also available in natural settings of BLU D,E,F,G,J, and K. Most of the non-motorized opportunities are available in the natural settings of BLUs A,C,F,G,H, and I. Some motorized opportunities are available in the natural settings of BLU C,D,E,J, and K.

Brazo Subunit: The Brazo subunit is located in the extreme southeast corner of the Conservation Unit, east of the Cebolla Wilderness Unit and south of the Acoma Reservation. The Brazo provides access to the Cebolla Wilderness from the east-southeast and is characterized by sandstone mesas and canyons covered by pinons, junipers, and ponderosa pines. Its rimrock country and vertical sandstone escarpments are prime raptor nesting habitat.

Past land uses have included homesteading, logging, farming, and ranching. The subunit contains several old homesteads with cultivated fields, corrals, and outbuildings. Old sawmill sites occur in the subunit. The evidence of historical use provides an opportunity to develop interpretive themes focusing on humanity's place in the natural landscape of the subunit.

Most of the natural settings available in the Brazo are in BLUs A,C,H,I, and J, with smaller amounts in natural settings B,D,G, and K. This subunit contains more non-motorized than motorized recreation opportunities (refer to Map 3-2).

Access to the subunit is by dirt roads that may be impassable during wet weather. The number of visitors who reach this subunit is currently unknown, but is estimated at many fewer than access the NM 117 corridor. The recreation potential of the Brazo subunit is somewhat limited by road conditions and land ownership (refer to the BLM Land Protection Plan, 1989).

Cerritos de Jaspe Subunit: The Cerritos de Jaspe subunit is surrounded by the National Monument, with the exception of about 3 miles along NM 53. The "little hills of jasper" are actually ridges of sandstone and limestone that form the southeastern flank of the Zuni Mountains. These ridges are surrounded by portions of three separate lava flows.

Vegetative mosaics of ponderosa pine with understories of shrubs, grasses and forbs, rock outcrop, scatterings of Douglas fir, and quaking aspen occur in the subunit. Most of the natural settings available are in BLUs A,C,F,G,H, and I. Very small amounts of acreage are available in natural settings in BLUs B,D, and K.

The subunit has high potential for recreation, but the opportunity is limited by lack of legal access. Cerritos de Jaspe contains approximately equal amounts of motorized and non-motorized recreation opportunity (refer to Map 3-2).

Cerro Brillante Subunit: The Cerro Brillante subunit extends from the southwestern corner of the NCA along the southern boundary and to NM 117. The subunit's northern boundary is CR 42, which also forms the southern and western boundary of the West Malpais Wilderness Unit.

The scenery is in the subunit characterized by broad vistas and a sense of openness. Cerro Brillante, a cinder cone reaching an elevation of approximately 8,050 feet, gives the subunit its name. Rolling hills and swales covered with grass and shrubs (BLU A) provide opportunities for horseback riding, hiking, and biking along unimproved roads. The rolling topography of the subunit is due to old lava flows, which create numerous small, closed basins where surface water collects during wet periods.

La Rendija, a large crack in the old basalt flows, bisects the subunit and marks a change in vegetation. The highest elevations in the subunit are west of this crack, where shrub/conifer with interspersed grass/shrub areas (BLU C) provide more dense vegetative screening.

Most of the natural settings available are in BLUs A,C, and H. Small amounts of acreage are available in the natural settings of BLUs B,D,F,G,I, and K. Cerro Brillante contains largely non-motorized recreation opportunities, with motorized opportunities concentrated in BLU E of the subunit (refer to Map 3-2).

Access to the Cerro Brillante subunit is by dirt roads that may be impassable during wet weather. Because access may be limited, the subunit's recreation potential is also limited. The number of visitors who reach this area of the NCA is unknown.

Continental Divide Subunit: The Continental Divide passes through this subunit. Located in the northwestern portion of the NCA, the subunit is bordered on the east by the El Malpais National Monument (refer to Map 3-1).

A series of aligned, steep-sided volcanic cinder cones and craters occurs along the west side of the NCA. A portion of this series occurs within the Continental Divide subunit.

Most of the natural settings available are in BLUs A,C, and H, with small acreages in the natural settings provided by BLUs D,F,G,I, and K. The majority of the recreation opportunity in the subunit is roaded (refer to Map 3-2).

Access to the subunit is by dirt roads that may be impassable during wet weather. Because access may be limited, the subunit's recreation potential is also limited. The number of visitors who reach this subunit of the Conservation Unit is unknown, but is considered to be many fewer than reach the NM 117 corridor. Recreation potential is also limited by the land pattern of the subunit, because over 50 percent of the land is in private ownership.

Neck Subunit: The Neck subunit is a basalt-floored valley between the Zuni Mountains on the west and Las Ventanas Ridge on the east. The subunit is truncated on the north by the Rio San Jose and Horace Mesa below Mount Taylor, bounded on the north by I-40, and defined along the west by NM 53 and the community of San Rafael. The eastern edge of the subunit includes a corridor along NM 117. The low relief and hummocky topography provide open, scenic views of the surrounding mesas, craters, and mountains.

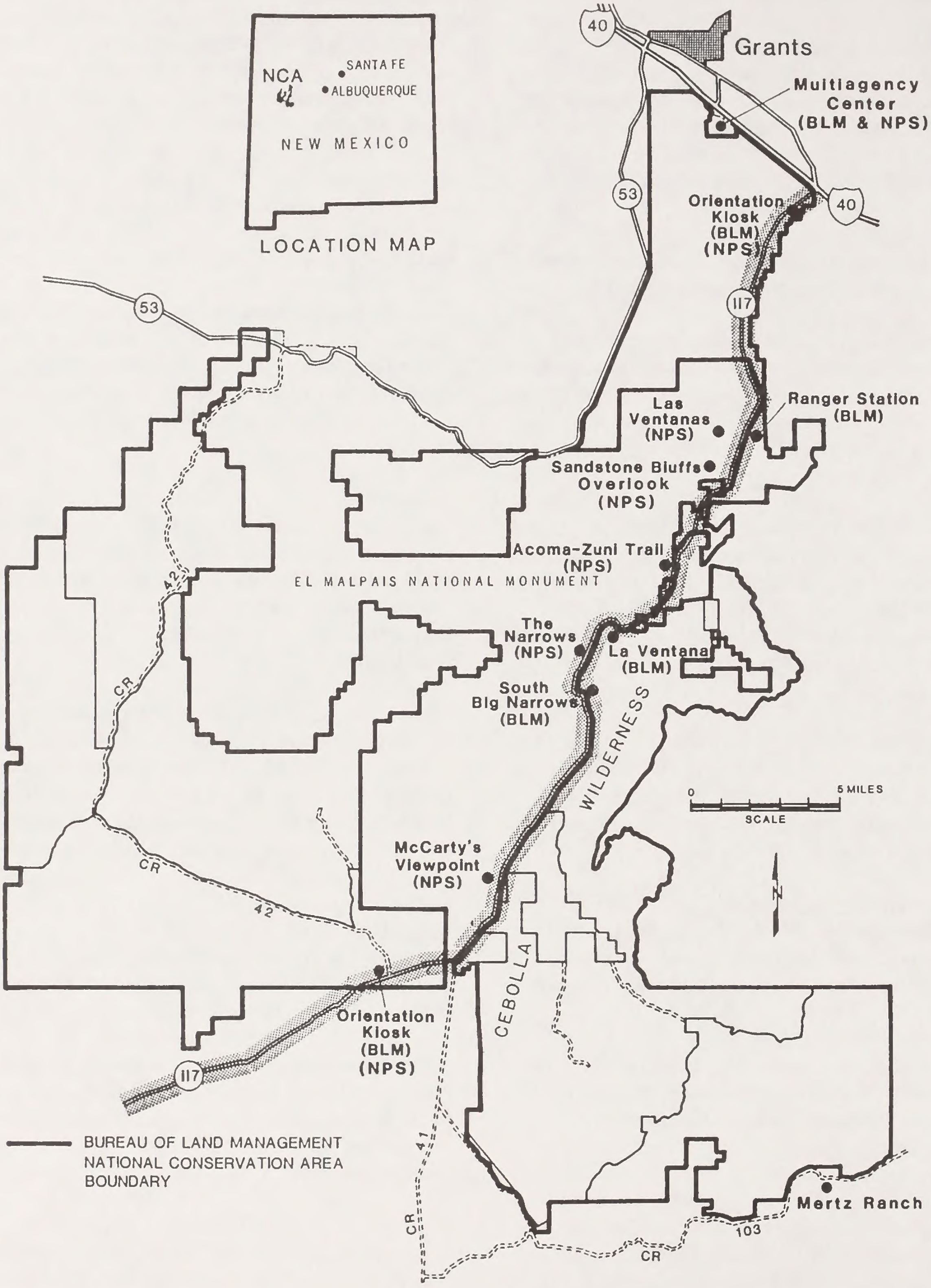
The northern portion of this subunit surrounds the site of the proposed Multiagency Center being planned by the National Park Service. This facility will draw visitors from I-40 and orient them to the Masau Trail, the El Malpais National Monument and Conservation Area, and the region of west-central New Mexico.

The majority of land within the Neck subunit is private (21,500 out of 27,600 acres). This private land includes the site planned for the Multiagency Center; the land will be purchased before construction can begin. Because most of the land in the Neck subunit is private, recreation potential is limited.

Most of the natural settings available are in BLUs A,B,C,E,F,G, and I. Small amounts of acreage are also available in the natural settings provided by BLUs D and H. Most of the recreation opportunity in the subunit is non-motorized.

NM 117 Corridor: The Conservation Unit's eastern corridor, NM 117, is easily accessible to visitors, so the east side of the unit most readily meets day-use visitation needs (refer to Map 3-3). The most intensive recreation use in the unit occurs along this route.

The NM 117 corridor is classified in the BLM's ROS system as "roaded natural." This roaded natural opportunity occurs in the natural settings of BLUs A,B,C,F and I. Some of these BLUs exhibit moderate to high erosion potential (refer to Table 3-l). This potential will be considered during all development phases for recreation facilities and services.



MAP 3-3
PROPOSED BLM/NPS DEVELOPMENT ALONG NM 117 CORRIDOR

The variety of vegetation and terrain present in the BLUs along NM 117 enhances the unit's visual appeal as well as varying the recreation opportunity. The contrast between dramatic variegated buff and pink sandstone cliffs with ponderosa pines clinging to crevices, open grassland meadows interspersed with pinon-juniper woodland, and expansive black lava flows covered with stunted conifers provides a unique visual experience for the traveler along NM 117.

The only developed recreation facility along NM 117 is a parking lot and trail at La Ventana Natural Arch. Visitor use data being collected by a traffic counter installed in September, 1989, indicates approximately 20,000 car visits to the arch are made each year. Using 2.6 persons per car (approximate NPS norm; Madell 1988), annual visitation is estimated to be as high as 40,000 people.

Recreation visitation to the El Malpais NCA and National Monument may grow to about 207,600 people by the year 2000 (Madell 1988). At that rate, the NM 117 corridor may be carrying approximately 20 percent of the total visitation projected.

Average daily traffic figures for 1989 will be available from the State Highway Department in 1990. When these numbers are available, a rate can be figured using them and data from the traffic counter to provide a more accurate picture of visitation at La Ventana. Further data gathering will be needed to determine how many visitors actually hike to the arch, how many park and look around, and how many just drive through.

Although visitor use of the South Big Narrows appears to be extensive (because physical impacts to the resources have occurred), specific visitor numbers are not currently available. State Highway Department data indicate traffic at the South Big Narrows is comparable to that at La Ventana.

The NM 117 corridor is an efficient asphalt-surfaced highway with a design speed of 55 mph. Four sections have been proposed for safety improvement through realignment, three of which are located in the NCA. These sections do not meet the design speed criteria and therefore fail to meet long-range safety objectives for the route. The straightening of the NM 117 alignment in these sections may create residual roadway segments that can be integrated into the BLM visitor management program for day-use access and/or additional facilities.

Multiple land ownership along NM 117 creates administrative and developmental situations that must be understood when enhancing the corridor for public use. Over three-fourths of the land west of NM 117 is National Monument. The National Park Service proposes to develop the Sandstone Bluff Overlook, the Las Ventanas cultural site, and other facilities along this corridor (refer to Map 3-3). This situation effectively limits the need for a single agency to provide for all types of recreational use and presents the opportunity for both the NPS and the BLM to develop complementary visitor services.

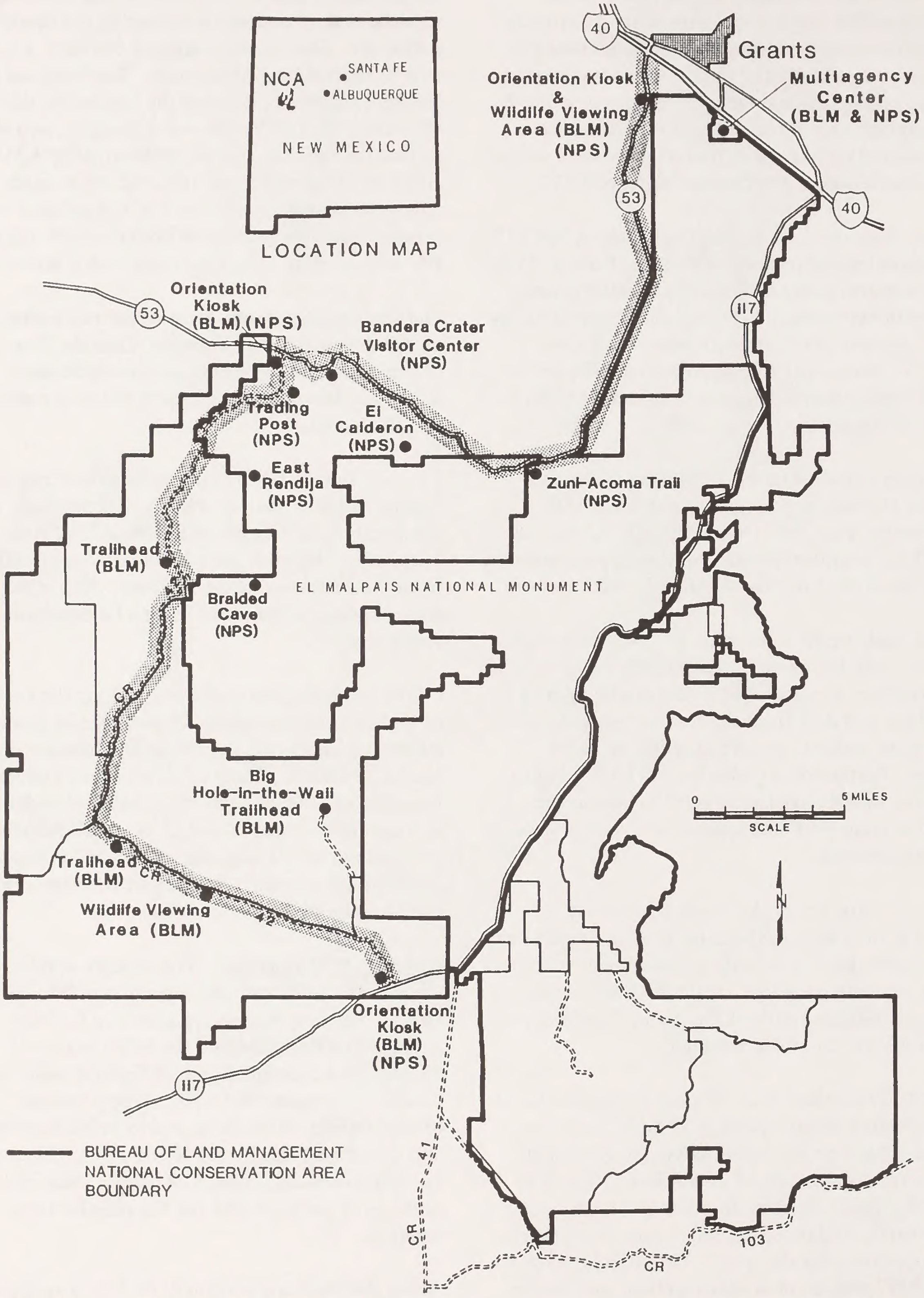
Outside the monument, most of the remaining lands east and west of NM 117 (approximately 78 percent of the Neck subunit) are in private ownership. Thus, only a few locations for visitor facilities are available on public land.

The east side of NM 117 presents a challenge of a slightly different nature. Nearly half the route is bordered by the Cebolla Wilderness Unit (refer to Map 3-3). The wilderness boundary begins 300 feet from the centerline of the highway. As a result, the zone in which visitor facilities can be developed is very narrow.

Of the remaining non-wilderness along the east side of NM 117, approximately 10 miles are in private ownership and 3 miles are unusable because of the sandstone bluffs. The result is a limited number of locations capable of supporting facilities and/or services for visitors. Some of the non-wilderness private land on the east side of NM 117 is proposed for acquisition (refer to Appendix B, a summary of the BLM Land Protection Plan).

NM 53/CR 42 Corridor: The western corridor through the NCA includes a portion of NM 53 where visitors will have convenient access to facilities proposed by the BLM and the NPS (Map 3-4). NM 53 is a well-maintained asphalt highway south of Grants. This route will serve as the principal access to the National Monument and its related facilities, and to the west side of the NCA. Along this route are approximately 10 miles of private land, including portions of the Neck and the Cerritos de Jaspe subunits.

Along the northern portion of NM 53, a spring-fed pond attracts waterfowl and shore birds to areas adjacent to the road. Although most of the land covered by the pond is private, the opportunity to provide a pullout for viewing waterfowl exists.

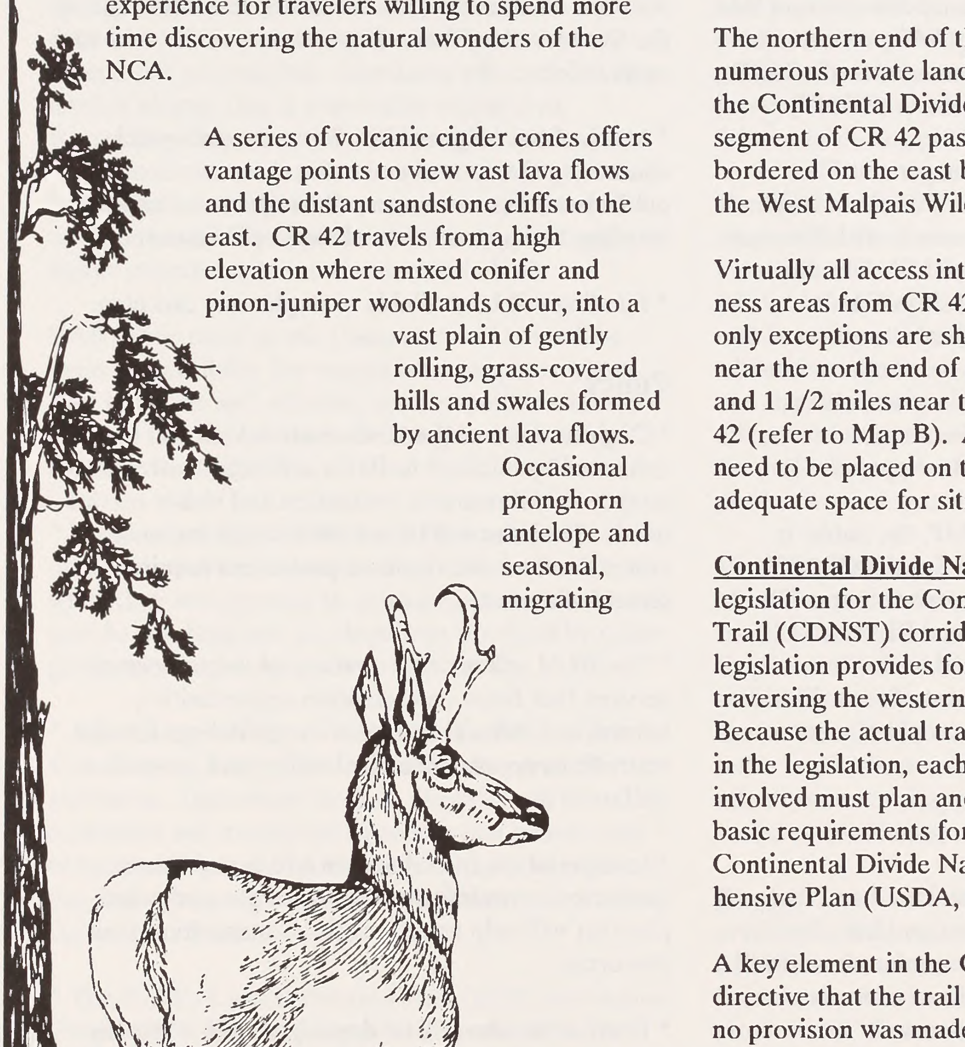

NCA
SANTA FE
ALBUQUERQUE
NEW MEXICO
LOCATION MAP
40
Grants
Orientation Kiosk & Wildlife Viewing Area (BLM) (NPS)
Multiagency Center (BLM & NPS)
53
40
117
Orientation Kiosk (BLM) (NPS)
Bandera Crater Visitor Center (NPS)
Trading Post (NPS)
El Calderon (NPS)
East Rendija (NPS)
Zuni-Acoma Trail (NPS)
Trailhead (BLM)
Braided Cave (NPS)
EL MALPAIS NATIONAL MONUMENT
CR
42
Big Hole-in-the-Wall Trailhead (BLM)
0
5 MILES
SCALE
N
Trailhead (BLM)
Wildlife Viewing Area (BLM)
Orientation Kiosk (BLM) (NPS)
117
41
CR
CR
103
BUREAU OF LAND MANAGEMENT NATIONAL CONSERVATION AREA BOUNDARY

MAP 3-4
PROPOSED BLM/NPS DEVELOPMENT ALONG NM 53/CR 42 CORRIDOR

The roaded natural recreation zone occurring along CR 42, which is a maintained (graded) dirt road, is less accessible than the zones along NM 53 and NM 117. Therefore, the west side of the NCA will likely be attractive to those interested in overnight or more extended visits.

This roaded natural recreation opportunity contains natural settings provided by BLUs A,C,D,G,H, and I (refer to Map A). Volcanic landscape dominates this zone and provides a different visual experience for travelers willing to spend more time discovering the natural wonders of the NCA.

A series of volcanic cinder cones offers vantage points to view vast lava flows and the distant sandstone cliffs to the east. CR 42 travels froma high elevation where mixed conifer and pinon-juniper woodlands occur, into a vast plain of gently rolling, grass-covered hills and swales formed by ancient lava flows. Occasional pronghorn antelope and seasonal, migrating waterfowl can be viewed from CR 42. Seasonal ponds attract waterfowl and shore birds to areas near the road and on public land. A pullout and viewing platform would provide an opportunity for observation and environmental education on high desert ecosystems.



CR 42 can be rough under dry conditions and impassable when wet. This situation affects access to the west side of the NCA and will be reflected in the overall figures for annual visitation.

The northern end of this route provides access for numerous private landowners who own property in the Continental Divide subunit. The southern segment of CR 42 passes through open country bordered on the east by the National Monument and the West Malpais Wilderness Unit.

Virtually all access into the monument and wilderness areas from CR 42 will have to be on foot. The only exceptions are short segments of about 5 miles near the north end of the Continental Divide subunit, and 1 1/2 miles near the junction of NM 117 and CR 42 (refer to Map B). Any proposed facilities would need to be placed on the west side of CR 42 to allow adequate space for siting and concentrated use.

Continental Divide National Scenic Trail: The legislation for the Continental Divide National Scenic Trail (CDNST) corridor was passed in 1968. This legislation provides for the dedication of a trail route traversing the western U.S. from Canada to Mexico. Because the actual trail alignment was not identified in the legislation, each federal and state agency involved must plan and propose a route. Criteria and basic requirements for the route are found in to Continental Divide National Scenic Trail Comprehensive Plan (USDA, FS 1985).

A key element in the CDNST legislation is the directive that the trail alignment be on public land; no provision was made for acquiring private land. To gain access to private land, exchanges or agreements with the landowner(s) will be required. For the most part, the trail route proposed in this GMP crosses public land and avoids private land (refer to the discussion of trails later in this section for Map 3-5, which shows the proposed CDNST route).

Through the Rio Puerco Resource Management Plan (RMP; 1986) the BLM identified a route whereby the CDNST would follow NM 117 and continue on through what is now the Cebolla Wilderness Unit. Routes to the west and nearer to the actual divide were rejected in the RMP because the affected lands were in mixed ownership.

With the passage of the El Malpais legislation, a systematic program of land acquisition has changed the ownership status along the west side of the NCA (refer to Appendix B for a summary discussion of this land acquisition program). This GMP proposes an amended route from that recommended in the RMP (refer to Appendix C for a discussion the RMP).

The BLM Socorro Resource Management Plan (1989) and the Cibola Forest Plan (1985) identify routes for the trail that did not connect with the route recommended in the Rio Puerco RMP. The Rio Puerco RMP applies to public lands in Cibola County, New Mexico, so the applicable portion of the proposed route extended only to the southern boundary of this county. Further coordination between agencies and jurisdictions has been required to ensure the routes connect (refer to Appendix C).

As part of their review of this GMP, the public is urged to indicate their preference for the CDNST route location and the reason for their choice. The Final GMP will identify the selected BLM route. This information will be forwarded to the Secretary of Agriculture as the trail alignment of record for the BLM, and the Secretary will officially designate a route.

Assumptions

* The BLM will focus on resource-based and dispersed recreation in the Conservation Unit. Facility-based recreation will be kept to a minimum, and will be instituted in response to threats to resource damage, visitor safety, or public demand.

* The National Park Service (NPS) will develop the recreation facilities described in the NPS General Management Plan (1990).

* Recreation opportunities within the Conservation Unit are available within a 2- to 3-hour drive from two of the largest metropolitan areas in New Mexico, Albuquerque and Santa Fe. Regional tourism will accelerate as urban New Mexicans discover recreational opportunities within the state (Task Force on Outdoor Recreation Resources and Opportunities 1988). Trends indicate out-of-state tourism will also increase.

* The State of New Mexico, cities of Grants and Albuquerque, and Native American groups are actively seeking the economic benefits of the tourism industry. As the El Malpais region becomes better known, use will increase.

* Based on NPS projections for visitor use in the National Monument (Madell 1988), recreation use of the Conservation Unit will increase over the next 10 years.

* Much of the responsibility for maintaining and conserving the natural and cultural resources on public lands lies with users, and requires an understanding and appreciation of the lands' resources.

* Funding will be available to implement this plan.

Policy

* Dispersed use of the Conservation Unit will be enhanced by minimal facilities sufficient to accommodate initial resource protection and visitor service needs. Facilities will be oriented to day use until visitor demand and resource protection requirements dictate otherwise.

* The BLM will provide a variety of visitor-related services that focus on recreation opportunities, natural and cultural appreciation, guidelines for and restrictions on use, individual safety, and general welfare.

* Interpretation and education will be a primary theme to convey information, concepts, and principles that will help to protect the Conservation Unit's resources.

* Recreation sites will be developed only where the intrinsic capability of the land can accommodate the projected use. In areas where the existing use pattern is intense, site and facility development may occur if consistent with the objectives set forth in the Rio Puerco Resource Management Plan (USDI, BLM 1986).

* Fragile or vulnerable resources will receive special management focused on their preservation. A monitoring system will be established, and use of

vulnerable areas will be restricted when their resources become threatened.

* Access roads and trails for recreation will require firm standards and careful planning so as not to promote use patterns that will deteriorate the recreation experience, adversely impact the resource, or conflict with other critical resources.

* The visual (scenic) experience will be maintained or enhanced through environmental design and visual quality standards. Roads, trails, and facilities introduced into the natural setting will require environmental (visual) analysis. Standards will establish the level of change that is acceptable within each Recreation Opportunity Spectrum (ROS) category.

* ROS guidance will be the management framework used to provide for appropriate activities, setting, and visitor experience in the Conservation Unit.

* All public lands in the Conservation Unit will be open and available for recreational purposes whenever visitation and activities are compatible with the planned use allocations and management prescriptions for the unit.

* Major recreation facilities will be developed, operated, and maintained in the Conservation Unit when they are essential to managing the public lands and do not duplicate developments provided by other government agencies or the private sector.

* All existing and future recreation facilities in the Conservation Unit will be maintained to prescribed standards. Operations at these facilities will be scheduled and monitored to ensure that proper care of these sites occurs. A shortage of funds may dictate the closing of portions of these facilities or shortening the season of use.

* The BLM's Land Protection Plan (1989) establishes the priorities for acquiring private lands within the NCA (refer to Appendix B). Private and public lands bordering the NCA whose acquisition may enhance resource management are considered in this GMP.

Management Prescriptions and Actions for Recreation

The following tables list the management prescriptions and actions proposed to maintain or enhance recreation opportunities for visitors to the Conservation Unit. The developments and services proposed include visitor orientation kiosks, trails, and wildlife viewing areas; facilities at La Ventana Natural Arch, the South Big Narrows, and the Dittert Site; a proposal for the Mertz Ranch; a Multiagency Center to be managed in conjunction with the National Park Service; an administrative center in Grants, New Mexico; and interpretive facilities at an historic homestead.

These prescriptions and actions are grouped under four main elements of concern to BLM staff and the public: facility development, visitor management, public information and education, and resource protection. These elements were recognized as important during public scoping meetings.

Facility development is an important recreation element for the Conservation Unit because development generally can only occur in this part of the NCA. At developed facilities, interpretation focuses on conveying information, concepts, and principles while creating changes in peoples' attitude and emotional state. Interpretation and education is the most effective communication tool available to the BLM for projecting a positive image and initiating a productive dialogue with the agency's public.

Visitor management focuses on providing a full range of recreation services, as well as reducing potential conflicts between recreation users and other users of the Conservation Unit. Protection of both cultural and historic resources is also part of managing visitor use in the unit. Resource protection focuses on restoration where resource damage already exists, effective monitoring of undesirable change in resource conditions, and patrol and surveillance.

Kiosks: Upon entering El Malpais, visitors should be oriented to the resources of the National Monument and NCA. In cooperation with the National Park Service, the BLM will construct four orientation kiosks at NCA entrance points to provide information to visitors. These kiosks will be located along paved highways NM 117 and NM 53 (refer to Maps 3-3 and 3-4, and to Figures 3-1 and 3-2).

A wildlife viewing area will be available at the northern kiosk along NM 53 where a marshy area provides bird habitat. The scenic values of these two highways should be maintained. Therefore, the BLM will attempt to acquire scenic easements along both highways.

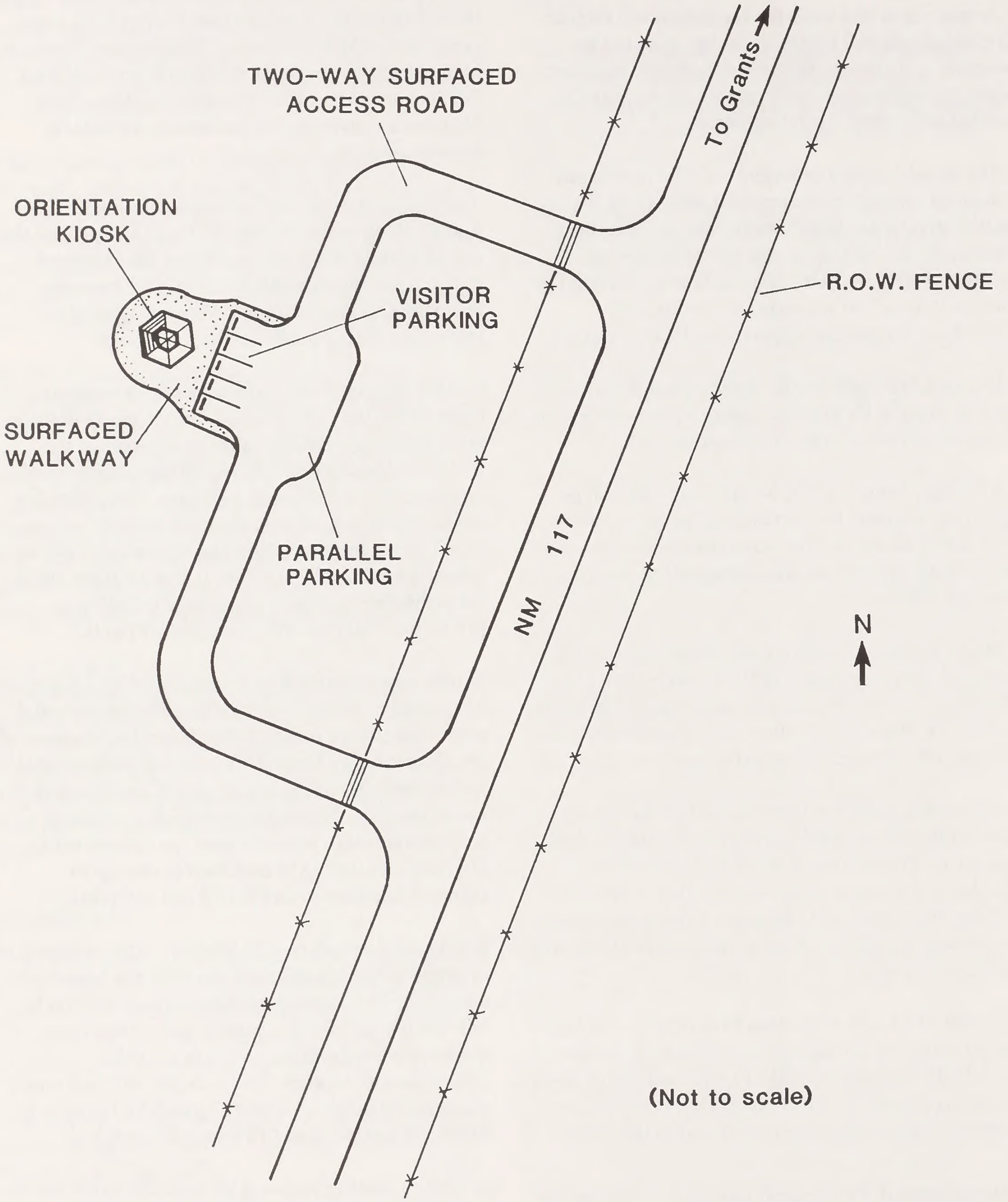


FIGURE 3-1
NORTH ORIENTATION KIOSK

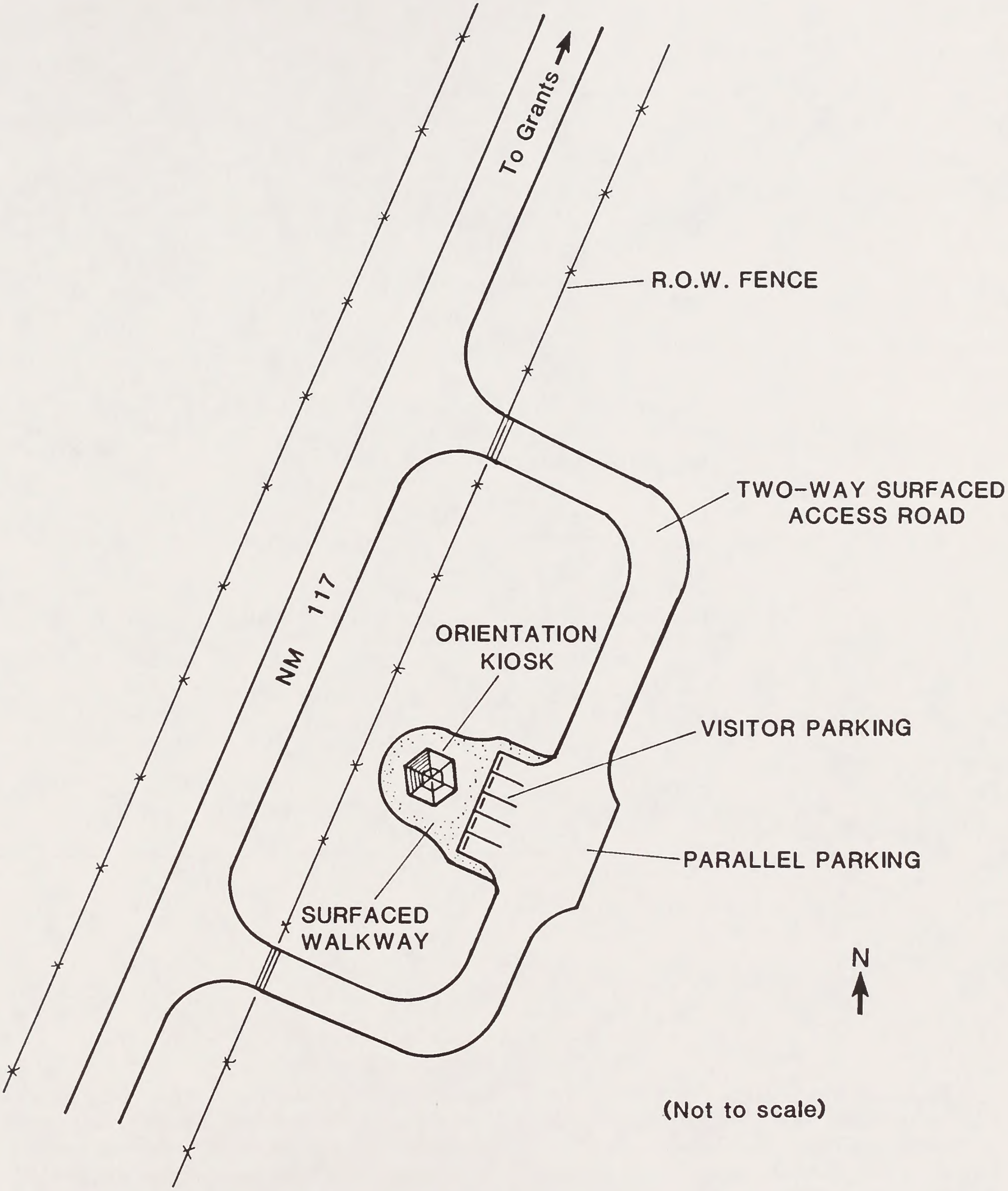


FIGURE 3-2
SOUTH ORIENTATION KIOSK

TABLE 3-3
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR KIOSKS

		Affected Environment	
Management Prescription	Action	Natural (BLUs)	Human
Facility Development			
Direct & orient visitors	Construct kiosks along NM 117 & NM 53	ABHE	
	Acquire land at entrance points in T10N, R9W, Sec. 22 & T10N, R10W, Sec. 2	BE	Information will enhance visitors' experience
Capture visitors' attention before they enter main part of NCA	Locate orientation kiosks at northern & southern entrances to NCA	ABHE	
Provide visitor safety			
	Construct pullouts for safe highway access	ABHE	
	Include basic safety information at kiosks		
Public Information & Education			
Provide overview information at entrance points for both NCA & NM	Include map of NCA & NM w/points of interest & services available		
	Post information about road conditions, weather, & planned activities at kiosks	ABHF	Information influences human behavior
Provide wildlife viewing where possible	Include information on migrating birds at kiosk located in T10N, R10W, Sec. 2, near marshy habitat	E	
Rensource Protection			
Protect scenic values	Acquire scenic easements along NM 117 & NM 53	ABCDE FGHIJ KL	Visitors expect high scenic quality

Ranger Station: A Ranger Station, as required by the El Malpais legislation, will be constructed by the BLM to provide for visitor services and resource protection. A number of sites have been considered in the planning process. The site selected best meets the environmental requirements for such a facility and the BLM's fiscal limitations, while protecting cultural and natural resources. The site is located in Section 32, T9N, R9W (refer to Map 3-3 and Figure 3-3), northeast of the Sandstone Bluffs Overlook in the National Monument. An environmental assessment has been prepared for the station, and Congress has appropriated construction funds. Infrastructure development and actual construction are expected to begin before the Final GMP is released.

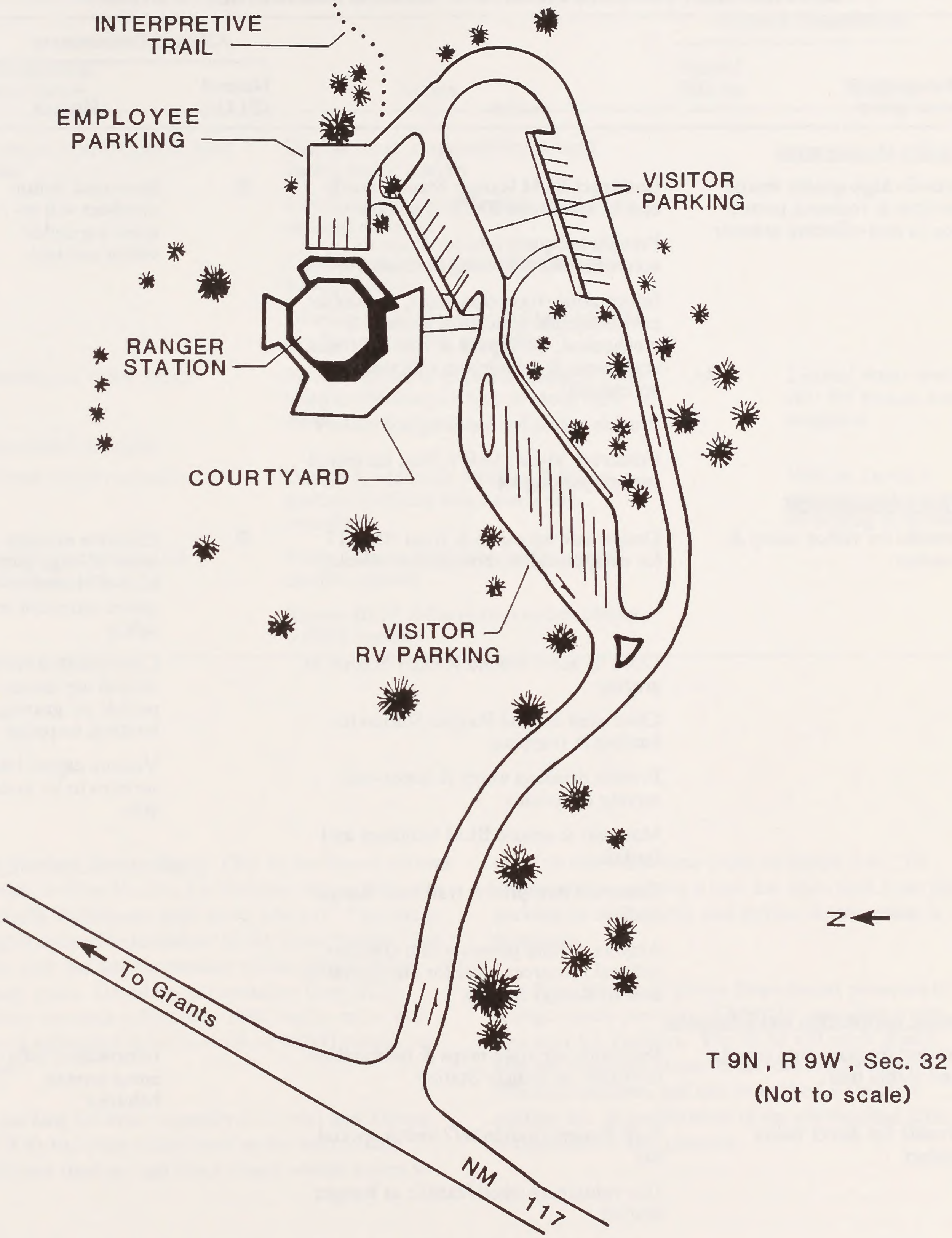


FIGURE 3-3
RANGER STATION DEVELOPMENT PLAN

TABLE 3-4
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR RANGER STATION

Management Prescription	Action	Affected Environment	
		Natural (BLUs)	Human
Facility Development			
Provide high-quality visitor services & resource protection in cost-effective manner	Construct BLM Ranger Station northeast of Sandstone Bluffs Overlook	B	Increased visitor numbers will require expanded visitor services
	Provide adequate interior space to accommodate following functional areas:		
	Information/reception, sales, & exhibits, environmental education, storage & mechanical, workspace & first aid room, restrooms, & 2-bedroom efficiency apartment		
	Provide access for handicapped visitors		
	Construct 30-car, 10-RV/bus, hardened-surface parking lot		
Visitor Management			
Provide for visitor safety & comfort	Design safe access to & from NM 117 for cars, buses, & recreational vehicles	B	Effective management of large numbers of visitors requires attention to safety
	Close 25 acres around Ranger Station to grazing		Concentrated recreational use incompatible w/ grazing, hunting, trapping
	Close area around Ranger Station to hunting & trapping		
	Provide drinking water & water-conserving restrooms		Visitors expect basic services to be available
	Maintain & secure BLM buildings and facilities		
	Construct interpretive trail near Ranger Station		
	Acquire private property that contains cultural resources ideal for interpretation next to Ranger Station		
Public Information and Education			
Prevent trespass onto private land within unit	Distribute accurate maps & information to visitors at Ranger Station		Information influences human behavior
Provide for direct visitor contact	Staff Ranger Station w/2 visitor specialists		
	Use volunteers when feasible at Ranger Station		
	Provide guided talks on interpretive trail		

TABLE 3-4 -- CONCLUDED

Management Prescription	Action	Affected Environment: Natural (BLUs)	Affected Environment: Human
Promote positive public land ethic	Discuss users' responsibility to land during visitor contact Distribute variety of written & oral educational material Conduct environmental education at Ranger Station Develop guided interpretive talk specific to adjacent cultural resources		
Provide for visitor safety	Inform visitors of potential dangers from using or drinking surface or stock tank water	All	Limited water available for human consumption
Resource Protection			
Protect visual resources	Design & construct building & infrastructure to blend into natural surroundings		Visitors expect a predominantly natural setting w/in unit
Provide base station for patrolling ranger	Equip Ranger Station w/radio communication system Ensure BLM radio system compatibility w/NPS system		

La Ventana Development: One of the largest natural arches in New Mexico, La Ventana, is located in the Cebolla Wilderness Unit along NM 117. This site is highly accessible to visitors in the Conservation Unit. The arch has been a popular visitor attraction for many years. Based on extrapolation from BLM visitor use data collected in 1989, visitor use of this site is estimated to be as much as 40,000 people per year.

A parking lot with a capacity of 12 cars and 3 buses or RVs has been constructed at the arch to stop resource damage and block illegal vehicle access to the Cebolla Wilderness (refer to Figure 3-4). To accommodate visitors, a trail has been built from the parking lot to the arch, and further development is proposed.

The New Mexico Highway Department proposes to realign unsafe portions of NM 117, including a portion near La Ventana. The BLM will work closely with the Highway Department and the NPS to provide safe entrance and exit from the La Ventana parking lot. Rehabilitation of the old roadbed after realignment is also planned.

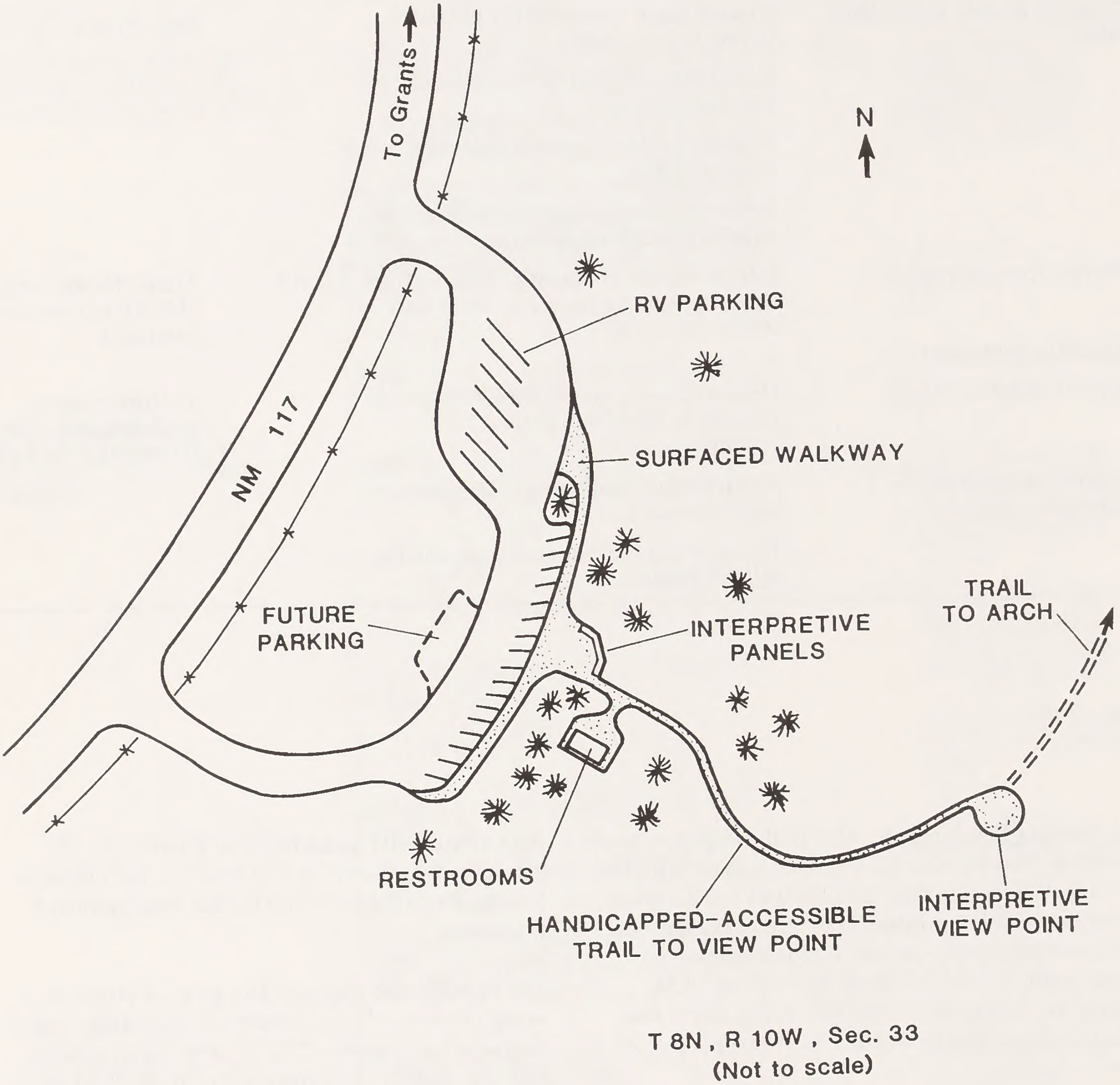


FIGURE 3-4
LA VENTANA DEVELOPMENT PLAN

TABLE 3-5
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR LA VENTANA NATURAL ARCH

		Affected Environment	
Management Prescription	Action	Natural (BLUs)	Human
Facility Development			
Provide for expanded visitor services	Construct vault toilets near parking lot	I	Easily accessible site being used for high-density recreation
	Upgrade existing trail to be handicapped accessible outside wilderness boundary		
	Construct photo point along handicapped-accessible portion of trail		
Visitor Management			
Ensure positive BLM image	Provide regular maintenance, including clean up, repairs, surveillance & patrol	I	Facility upkeep influences public opinion
Provide for visitor safety	Close area to grazing		Incompatible uses in concentrated recreation area
	Close area to hunting & trapping		
	Work cooperatively w/NM Hway Dept. in realigning NM 117		Existing curve is dangerous
Public Information & Education			
Promote visitor appreciation for land & natural processes	Develop site-specific interpretive roadside exhibit	I	Information influences human behavior
	Develop interpretive themes that reflect natural processes exemplified by arch, wilderness resource, & cultural resources		
Resource Protection			
Protect wilderness resource, scenic quality, & cultural resources	Design development to blend into natural surroundings	I	Visitors expect high scenic quality
	Resurface existing parking lot to blend better w/buff-colored sandstone		
	Place vault toilets where they will be visually unobtrusive		
	Monitor visitor use w/ traffic counter data		
Determine where use is occurring	Install people counter along trail		Visitors will impact resource
	Analyze data & make recommendations on visitor use capacity		
	Establish schedule for patrol & maintenance		
	Establish baseline inventory of surface artifacts & cultural sites in area		
	Monitor for change		

South Big Narrows Development: The South Big Narrows site in the Conservation Unit is being used for picnicking and parking for access to the Cebolla Wilderness Unit, as the facilities cannot be constructed inside wilderness. The site is the old roadbed of what is now NM 117. Traffic data from the New Mexico Highway Department indicate the location attracts a similar number of visitors as La Ventana and could be a high-use area. Safety must be improved because entering and exiting the site onto the existing highway is dangerous.

The site offers an opportunity for day use of the Cebolla Wilderness Unit, encompassing sandstone bluffs and lava features, appealing vegetation including stunted ponderosa pine, and a small prehistoric site. All these features are within a short walk from the highway and accessible to most visitors' skill levels. A rim trail within the Cebolla Wilderness Unit will be accessed from this site (refer to Figure 3-5 for a site plan, and to a later portion of this Recreation section for a discussion of trails).

TABLE 3-6
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR THE SOUTH BIG NARROWS

		Affected Environment	
Management Prescription	Action	Natural (BLUs)	Human
Facility Development			
Provide expanded visitor services	Construct gravel parking area to accommodate 8 cars Develop 6-table, small-party picnic area for day use Construct trailhead to access rim trail in Cebolla Wilderness	C	Area is used by visitors
Visitor Management			
Provide for safe visitor use	Work cooperatively w/ NM Hway Dept. & NPS to realign NM 117 Construct safe, single access to site Close area to grazing, hunting, & trapping	CF	Existing access unsafe
Public Information and Education			
Enhance recreational opportunity & provide resource protection through education	Develop trailhead information panels to include safety information, wilderness resource themes, and low-impact use techniques Use the trailhead to provide information that promotes positive public land ethic		Information and education will influence human behavior
Resource Protection			
Protect natural resources & maintain roaded natural recreation setting	Monitor visitor use Collect use data at trailhead Use traffic counters Take random surveys at trailhead Complete Class III archeological survey of all areas w/in 1/4 mile of trailhead & parking area Establish visitor use capacity based on data gathered Establish site patrol & maintenance by BLM rangers, other resource specialists, or volunteers	C	Human use will impact resources Visitors will provide information
Restore damaged vegetation cover	Monitor for soil compaction that is affecting species composition Prevent removal of vegetation species through patrols		
Discourage trash accumulation	Encourage a pack-it-in, pack-it-out day-use ethic		

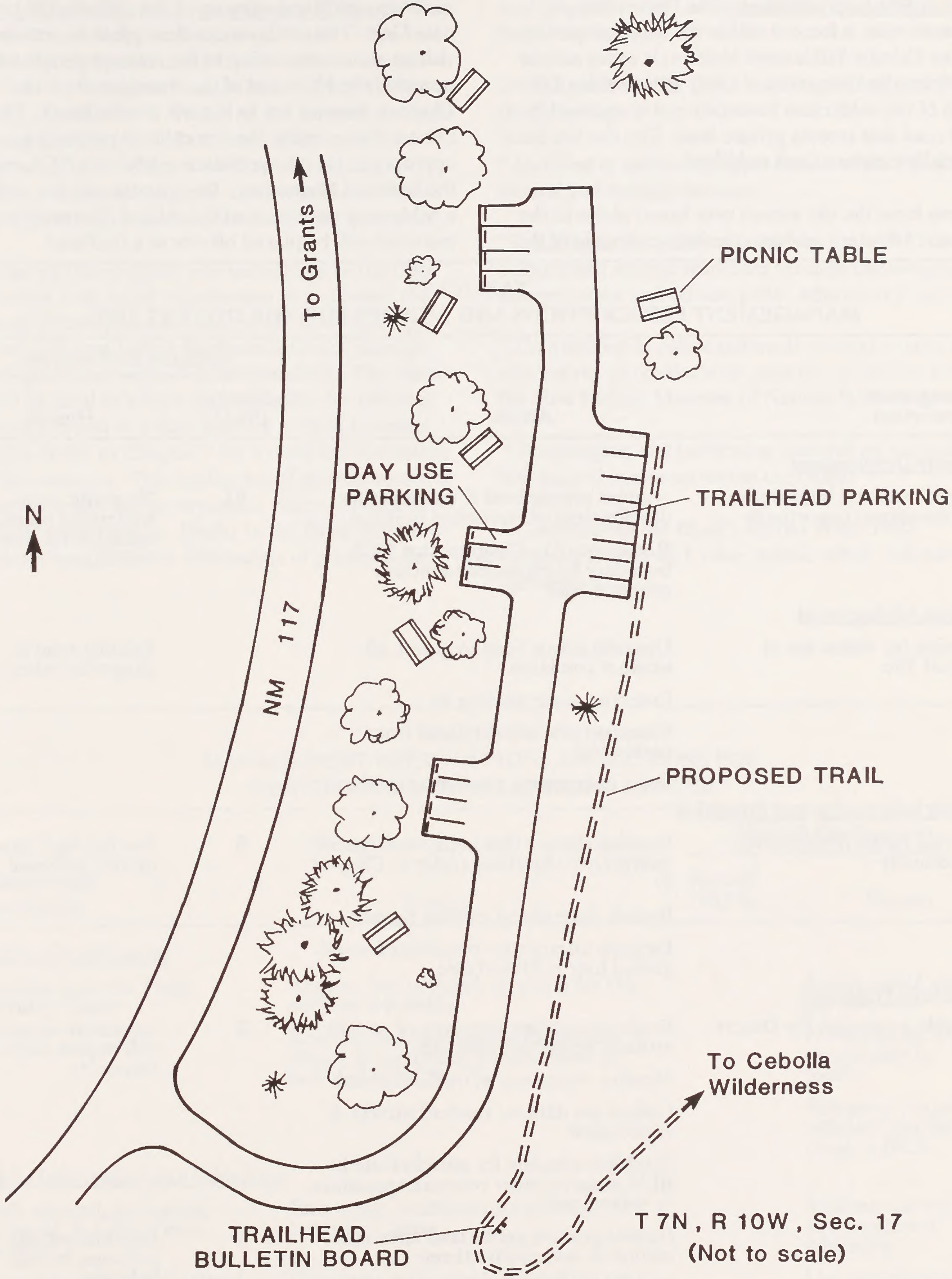


FIGURE 3-5
SOUTH BIG NARROWS DEVELOPMENT PLAN

Dittert Site Interpretation: The Dittert Site, an Anasazi ruin, is located within the southern portion of the Cebolla Wilderness Unit but is easily accessible from the Conservation Unit. It lies within 1/2 mile of the wilderness boundary and is accessed by a dirt road that crosses private land. The site has been partially excavated and stabilized.

Views from the site extend over broad plains to the Chain of Craters, and into the broken terrain of the sandstone cliffs and canyons of the Cebolla Wilderness Unit. The site is an excellent place to provide visitors an understanding of the Anasazi people who occupied the NCA and of the transition from the Chacoan Anasazi era to historic pueblo times. The Dittert Site is one of the few cultural properties appropriate for interpretation in both the NCA and the National Monument. Because the site lies within a wilderness unit, most of the related interpretive materials will be placed off-site at a trailhead.

TABLE 3-7
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR THE DITTERT SITE

Management Prescription	Action	Affected Environment	
		Natural (BLUs)	Human
Facility Development			
Provide cultural interpretive & educational opportunity	Acquire private land & easement for development of recreation facilities	BI	No public, non-wilderness property available for construction
	Recommend to Congress that NCA boundary be expanded to include acquired land		
Visitor Management			
Provide for visitor use at Dittert Site	Upgrade access road to gravel, all-weather condition		Existing road is dangerous when wet
	Construct 6-car parking lot		
	Construct low-standard trail from parking lot		
	Erect interpretive panel near trailhead		
Public Information and Education			
Provide onsite interpretive opportunity	Develop themes that implement specific interpretive objectives (refer to Chapter 9)	B	Site has high interpretive potential
	Include natural and cultural themes		
	Develop interpretive brochures for self-guided tour of Dittert Site		
Resource Protection			
Provide protection for Dittert Site	Establish baseline inventory of surface artifacts before opening site	B	Increased visitation will impact cultural resources
	Monitor visitor use w/traffic counters		
	Collect use data w/ random surveys & registration		
	Establish schedule for patrol of site by BLM rangers, other resource specialists, or volunteers		
	Include positive public land ethic information as interpretive theme		Information will influence human behavior
	Monitor change in surface artifacts, record data, & make recommendations on visitor use capacity		Relationship between visitor use & site deterioration needs clarification

Mertz Ranch/Field Learning Center Proposal: The Mertz Ranch is approximately 1,300 acres of private property contiguous to the Conservation Unit and surrounded by approximately 18 sections (11,520 acres) of public land. Water on the property includes springs and impounded streams. The ranch headquarters is in excellent condition and includes two homes, bunkhouses, and an historic homestead that could provide group education and living quarters.

Acquiring this property and including it in the Conservation Unit could complement and enhance the overall philosophy and intent of the El Malpais legislation, and could allow implementation of management goals and national BLM initiatives. The ranch could be used as a backcountry facility for resource protection, and as a field base for a Field Learning Center (refer to Chapter 9 for a complete discussion of this concept). This facility would provide resource protection and deliver expanded visitor services in a cost-effective fashion. [Refer to the BLM Land Protection Plan (1989) for discussions of priorities for land acquisition, or to Appendix B for a summary of these discussions.]

Overall goals for the Field Learning Center include the following:

* Instilling in visitors an appreciation of the NCA's natural and cultural heritage.

* Instilling in the public a sensitivity to the NCA's cultural and natural resources through encouraging interpretation and off-site public education programs.

* Cooperating in public outreach, natural science and cultural resource education, and interpretation with the New Mexico Museum of Natural History.

* Encouraging and facilitating research on cultural and natural resources within the NCA.

* Coordinating the BLM's actions at the Field Learning Center with other public, tribal, and private agencies.

TABLE 3-8
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR
MERTZ RANCH/FIELD LEARNING CENTER

Management Prescription	Action	Affected Environment Natural (BLUs)	Affected Environment Human
Facility Development			
Establish base for Field Learning Center	Acquire Mertz Ranch property for this purpose if feasible	C	Ranch would serve purpose well
	Recommend to Congress that Mertz Ranch & surrounding public land be included in NCA		Private lands are surrounded by public Resources on private land similar to those in NCA
Public Information and Education			
Study cultural, geological, historical, & natural environments	Encourage establishment of Field Learning Center		Support research & environmental education
Expand knowledge of natural resources in NCA	Cooperate w/research & teaching institutes, local Native American groups, & private entities		Use community & regional resources
Make information available to visitors	Promote natural & cultural resource research & education		Visitors would benefit directly from expanded services

TABLE 3-8 -- CONCLUDED

Management Prescription	Action	Affected Environment Natural (BLUs)	 Human
Provide "living laboratory" for NM Museum of Natural History	Implement MOU w/NM Museum of Nat'l History		
Resource Protection			
Provide resource protection	If acquired, use Mertz Ranch as back-country ranger station	C	Facilities at Mertz could accommodate this use
Continue to support natural resource research	Continue existing MOU w/US Forest Service & UNM Technical Applications Center	All	Facility could serve field research needs for several groups
Ensure best information available for management of NCA & NM	Channel results of research efforts into direct management practices for NCA	All	
	Establish MOUs w/ Native American groups interested in management of NCA		
	Establish MOU w/NPS for use of Field Learning Center		

Masau Trail and Multiagency Center: One of the main functions of the Multiagency Center being proposed by the NPS and the BLM is to provide visitor services and information for the Masau Trail. The Center would be located just south of the city of Grants (refer to Map 3-3).

The Masau Trail is a vehicular tour route that links prehistoric and historic cultural sites in New Mexico and eastern Arizona. It includes the El Malpais National Monument and National Conservation Area. The Multiagency Center and its interpretive media will serve as the central information point for the Masau Trail.

The center will not be a "destination" interpretive facility; rather, it will provide "stage-setting" interpretation and information to encourage visitors to see the outstanding resources of El Malpais, the region, and the Masau Trail for themselves. Functions of this facility are outlined in detail in the NPS General Management Plan (1990).

Under the Preferred Alternative for the Masau Trail, the NPS includes a "Western Pueblo Route" along NM 117. A location on Indian trust land along NM 117 could be incorporated into this route and add significantly to the region's recreational opportunities. This is the Kowina Foundation property and associated Calabash Ruins that sit atop a mesa that provides commanding views of the region. The facilities include a large building constructed in the early 1960s and an extensive prehistoric pueblo site that has been partially excavated and stabilized. The main building contains space appropriate for meeting areas, displays, and living quarters, and is surrounded by gardens and a patio.

The Pueblo of Acoma owns the Kowina Foundation property. Incorporation of this property into the El Malpais/Masau Trail interpretive program would take place only with the wholehearted approval of the Pueblo of Acoma. The BLM can provide technical assistance on the development of Kowina if the pueblo requests it.

Specific interpretive objectives developed for the NCA and appropriate for this location are: to give visitors an understanding of the transition from the Chacoan era to present times, and to instill visitors with respect and appreciation for El Malpais by allowing them to view it through the eyes of local Native Americans.

TABLE 3-9
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR THE MULTIAGENCY CENTER

		Affected Environment	
Management Prescription	Action	Natural (BLUs)	Human
Facility Development			
Construct Multiagency Center	Refer to NPS General Management Plan (1990)	E	Construction mandated by El Malpais legislation
Visitor Management			
Provide recreation opportunities for visitors	Serve in full partnership role w/NPS, local Native American groups, communities of Grants & Milan, & other agencies in developing Masau Trail		Visitors will receive services only through well-coordinated interagency effort
	Cooperate in a full partnership role in development of multi-agency visitor center		
	Identify sites appropriate for addition to Masau Trail		
Public Information & Education			
Encourage respect for Native American concerns & viewpoints	Cooperate w/Pueblo of Acoma, NPS, & other agencies to develop & use facilities at Kowina Foundation property if pueblo requests government assistance	B	Site suitable for interpretation
Provide opportunity to view expansive landscapes & impressive cultural site at Kowina Foundation	Through MOU w/Acoma Pueblo, provide guided tours of Calabash Ruins & mesa top views		Visitors will be attracted to these features

* * *

General Administrative and Management Prescriptions Directed from the Grants Administrative Site: BLM personnel in Grants carry the primary responsibility for administering the NCA (refer to Chapter 2 for a discussion of staffing). Assistance is provided by other BLM offices in Albuquerque, including the Rio Puerco Resource Area and the Albuquerque District.

Administration of the NCA will require office space, which will be located in the city of Grants. Grants is a central location and is the most effective site for the headquarters. One function of this office will be to implement the management prescriptions and actions outlined in this plan.

The space will be shared with the NPS and meet the criteria for office space and wareyard needs of both agencies. Co-locating with the NPS will allow maximum communication between the two federal agencies administering the NCA and NM. Placing primary administration functions in the Multiagency Center or at the BLM Ranger Station is undesirable because of the likely conflict between two different functions in one building, and because of the potential for administrative functions to impinge on visitor functions.

TABLE 3-10
GENERAL ADMINISTRATIVE AND MANAGEMENT PRESCRIPTIONS & ACTIONS DIRECTED FROM THE GRANTS ADMINISTRATIVE SITE

Management Prescription	Action	Affected Environment: Natural (BLUs)	Affected Environment: Human
Visitor Management			
Prevent trespass onto private land in NCA	Acquire select inholdings by purchase or exchange	ABCD IJ	
	Use priorities established in Land Protection Plan (Appendix B)		
	Work cooperatively w/ private landowners to effectively sign their property		Private landowners concerned about potential impacts to property from visitors Significant resources & access may be privately owned
Provide for visitor safety	Distribute accurate & current information on weather & road conditions	All	Information can influence human behavior
	Encourage Cibola County to upgrade & improve CR 42 to an all-weather road		
	Cooperate w/local, state, & federal organizations in search-&-rescue operations		
	Cooperate w/NM Hway Dept. & NPS to realign NM 117		Unsafe conditions now exist
	Develop brochures that include safety information		Visitors will read brochures
Public Information & Education			
Promote positive public land ethic	Develop information on how human use will impact natural & cultural resources	All	Information will influence human behavior
	Develop brochures on low-impact backcountry use		
	Stress use of campstoves; pack-it-in, pack-it-out practices; minimum-impact camping, hiking, & horse use		
	Emphasize strong wildland ethic, safety & orientation information		
	Develop & conduct environmental education programs through local school system		People of community are users of NCA
	Develop & implement outreach program for community & region through civic groups, community fairs, & local school system		
Encourage respect for Native American concerns & viewpoints	Develop interpretive materials in cooperation w/interested local Indian groups		

TABLE 3-10 -- CONCLUDED

Management Prescription	Action	Affected Environment Natural (BLUs)	 Human
Resource Protection			
Provide for resource protection	Identify non-essential vehicular ways & close them to unauthorized use		Excessive vehicular use will impact natural resources & undeveloped recreation settings
	Staff w/ two rangers for patrol & surveillance		
	Develop effective monitoring system to measure resource change		Use will cause change
	Establish frequent, regular patrols to monitor resources		
Deter unauthorized vehicular traffic	Post signs along boundaries		
	Develop maps showing open access points		
	Monitor & patrol for unauthorized access		
	Use outreach program to inform users of road closures		
	Cooperate w/NPS in backcountry planning for management of Cerro Encierro Road	CHG	Northern access to Big Hole in the Wall, West Malpais Wilderness; lands along roadways are private Design work will be done by BLM Denver Service Center
Protect visual resources in NCA	Acquire scenic easements along NM 117, NM 53, & CR 42		
	Coordinate & review facility designs by supporting staff		
	Ensure facilities blend harmoniously w/ natural landscape		

Trails: The development of a trail system within the El Malpais NCA will enhance visitors' understanding and appreciation of the NCA's resources and provide an opportunity for visitors to experience an expanded variety of recreation opportunities (ranging from primitive to roaded natural). The proposed trails cross both wilderness and non-wilderness areas (refer to Map B).

Off-road vehicle (ORV) use has been limited to existing roads by the Rio Puerco Resource Management Plan (RMP; USDI, BLM 1986). An extensive network of primitive roads provides ample opportunities for ORV use. Opportunities for hiking (on approximately 54 miles of primitive roads), horseback riding (on 27 miles), and mountain biking (on 20 miles) will also be available (refer to Map B).

Interest in bicycling has dramatically increased in recent years, and the trend is expected to continue. Bicycle enthusiasts are working with the New Mexico Highway Department to accommodate bicycle touring along NM 53.

The BLM can offer a different biking opportunity in the NCA along the existing dirt roads and ways in the Chain of Craters Unit, where a range of mountain bike skill levels can be accommodated. If demand occurs, activities could include permitted mountain bike events. The Biophysical Land Units crossed by the mountain bike trails exhibit soil and vegetative conditions stable enough to accommodate this use. The natural settings available along biking trails include primarily BLUs A,C, and H (refer to Maps A and B).

A segment of the Continental Divide National Scenic Trail (CDNST) is proposed to pass through both the NCA and the National Monument. The Rio Puerco RMP identified a route for the CDNST that passes through the Cebolla Wilderness Unit. This route has been reanalyzed during development of this GMP, using new information not available at the time of RMP development. Because the route proposed in the RMP crosses highly erodible soils and an area of high-density cultural resources preserved for long-term scientific use (refer to the discussion of Cultural Resources later in this chapter and to Appendix C), an alternative trail route is proposed in this GMP (refer to Map 3-5).

The proposed new CDNST route will skirt I-40 in the Neck subunit, and pass through sandstone terrain on the east side of the NCA, where hikers can stop for water and information at the BLM Ranger Station. The trail will then cross the National Monument along the Zuni-Acoma Trail, where lava flows will provide a different visual experience for hikers. After crossing the lava, the trail will pass close by the NPS Visitors Center near Bandera Crater, traverse the Chain of Craters Wilderness Study Unit, and cross over the rolling terrain of the North Plains in the southern portion of the Conservation Unit. (Once the CDNST leaves the NCA, it must connect with lands administered by the BLM Socorro Resource Area; refer to Appendix C). To provide this connection, easements must be acquired.

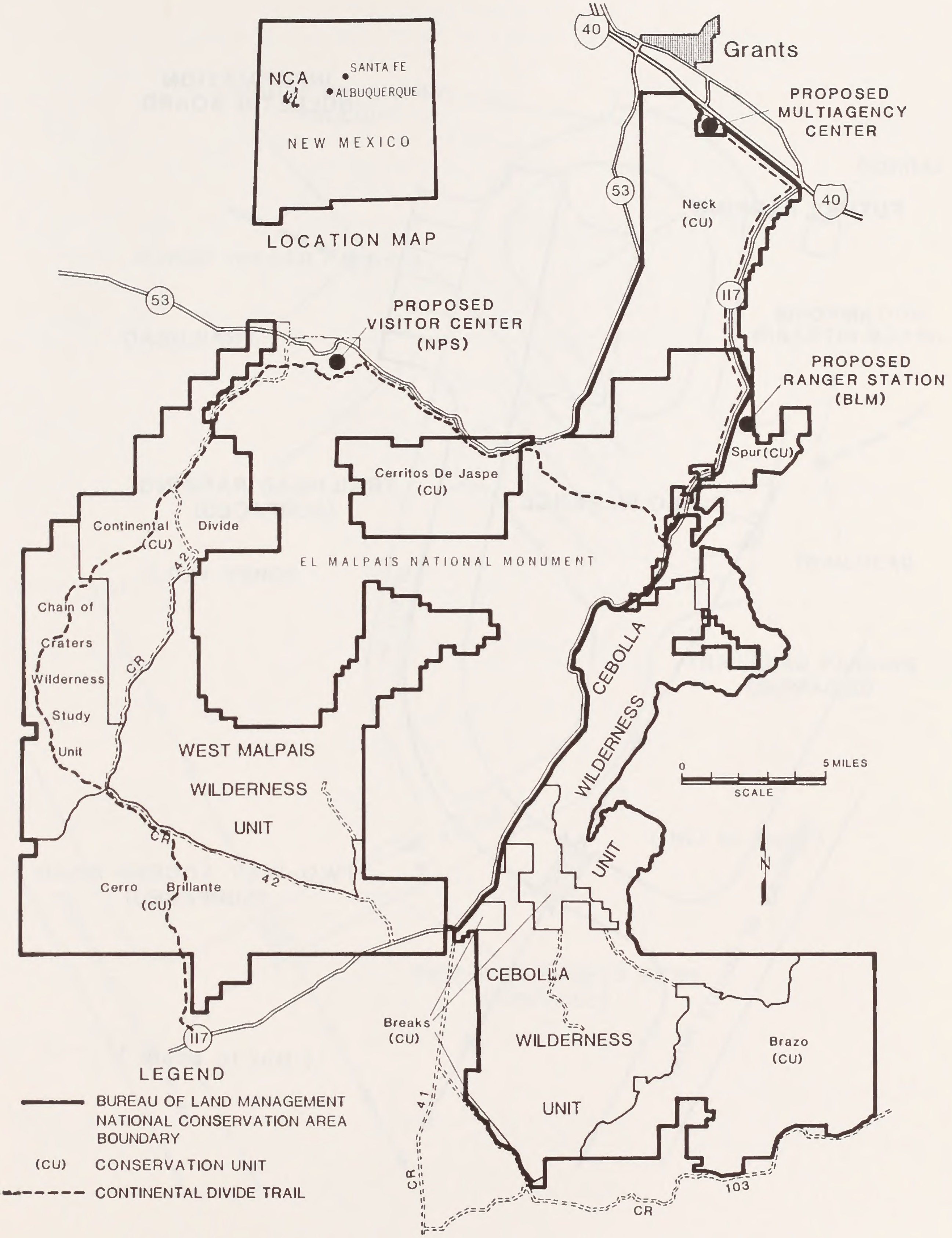
This route will provide visual variety, travel through a number of ecotypes, and more closely follow the actual Continental Divide. Some segments of the trail will be open to foot and horse traffic, others to foot traffic only. Accommodating a variety of users along different portions of the trail will minimize conflicts. A loop trail along the route proposed in the Rio Puerco RMP may be developed if high levels of visitor use warrant more development.

The southwestern segment of the CDNST, which crosses the North Plains, will be managed for equestrian use as well as hiking. The wide open lands of this portion of the Conservation Unit lend themselves to horseback riding in a setting reminiscent of earlier days when cattle were trailed by horseback. This segment will pass La Rendija, a large crack in the ancient lava flows.

Where the proposed trail leaves the NCA, it will cross approximately three sections of private land (refer to Map 2-1 in Chapter 2). The BLM must either acquire these sections or obtain a recreation easement. If neither of these alternatives are possible, the trail will follow CR 42 to NM 117.

Trails proposed for primitive settings are located in the Cebolla and the West Malpais wilderness units. A rim trail marked with rock cairns will be developed from the south end of the Narrows to overlook La Ventana Arch. This trail will be limited to hikers only, and will provide a day-use opportunity for visitors where proximity to NM 117 makes the trail easily accessible. A trail into Big Hole in the Wall will be developed in the West Malpais Wilderness Unit; it will accommodate both hikers and horseback riders. Figures 3-6 and 3-7 show typical trailhead facilities, one of which can accommodate horseback riders. Planning and development of any other trails will occur on a case-by-case basis, as user demand indicates a need.

Construction and location of all trails must avoid conflicts with private waters and lands located in the vicinity. Development of the Cerritos de Jaspe subunit is limited because access is across private land. Proposals for trail development in this subunit are contingent upon acquisition of private land and cooperation with the NPS in backcountry management.



MAP 3-5
PROPOSED BLM TREADWAY FOR THE CONTINENTAL DIVIDE NATIONAL SCENIC TRAIL

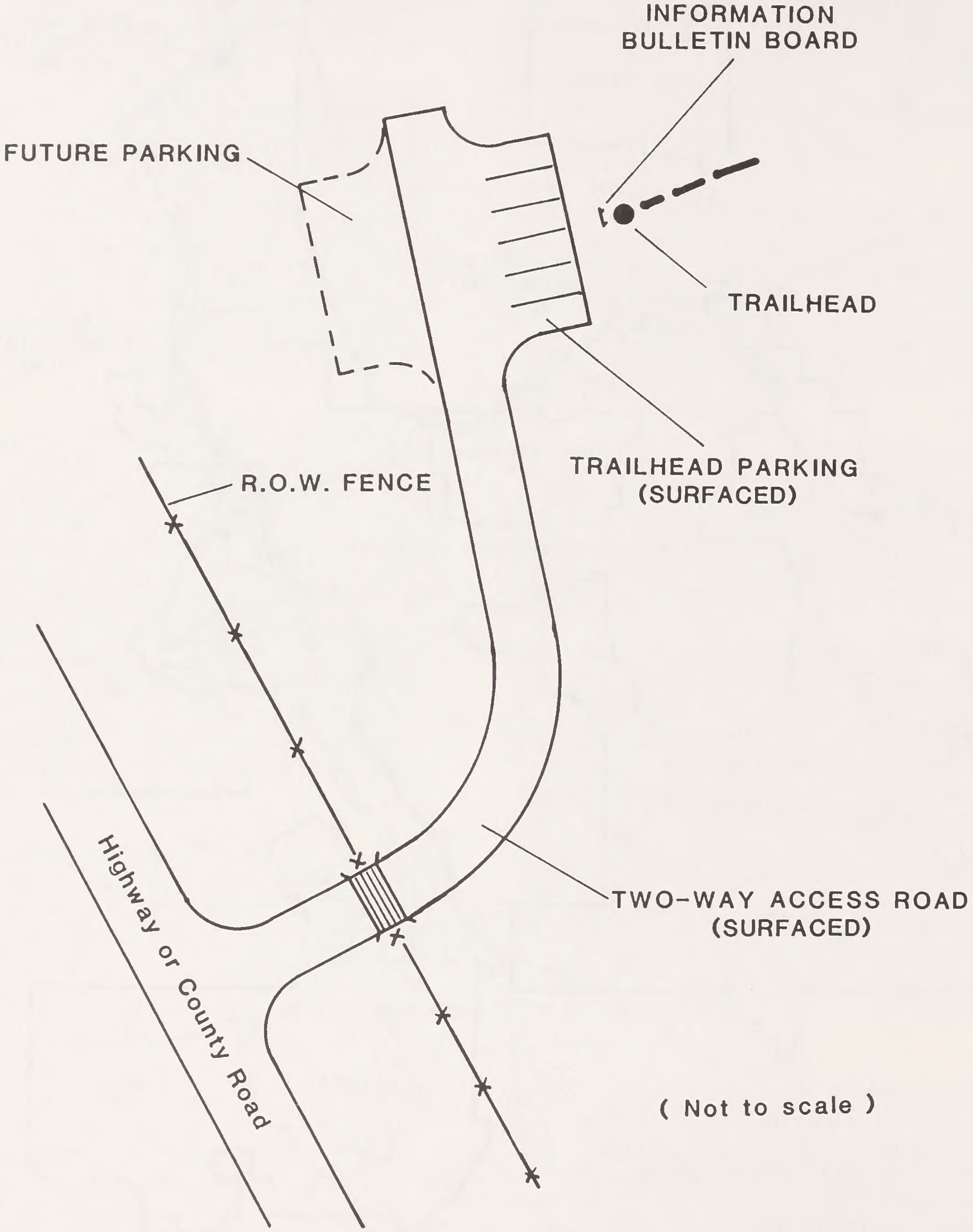

INFORMATION BULLETIN BOARD
FUTURE PARKING
TRAILHEAD
TRAILHEAD PARKING (SURFACED)
R.O.W. FENCE
TWO-WAY ACCESS ROAD (SURFACED)
Highway or County Road
(Not to scale)

FIGURE 3-6
TYPICAL TRAILHEAD FACILITY

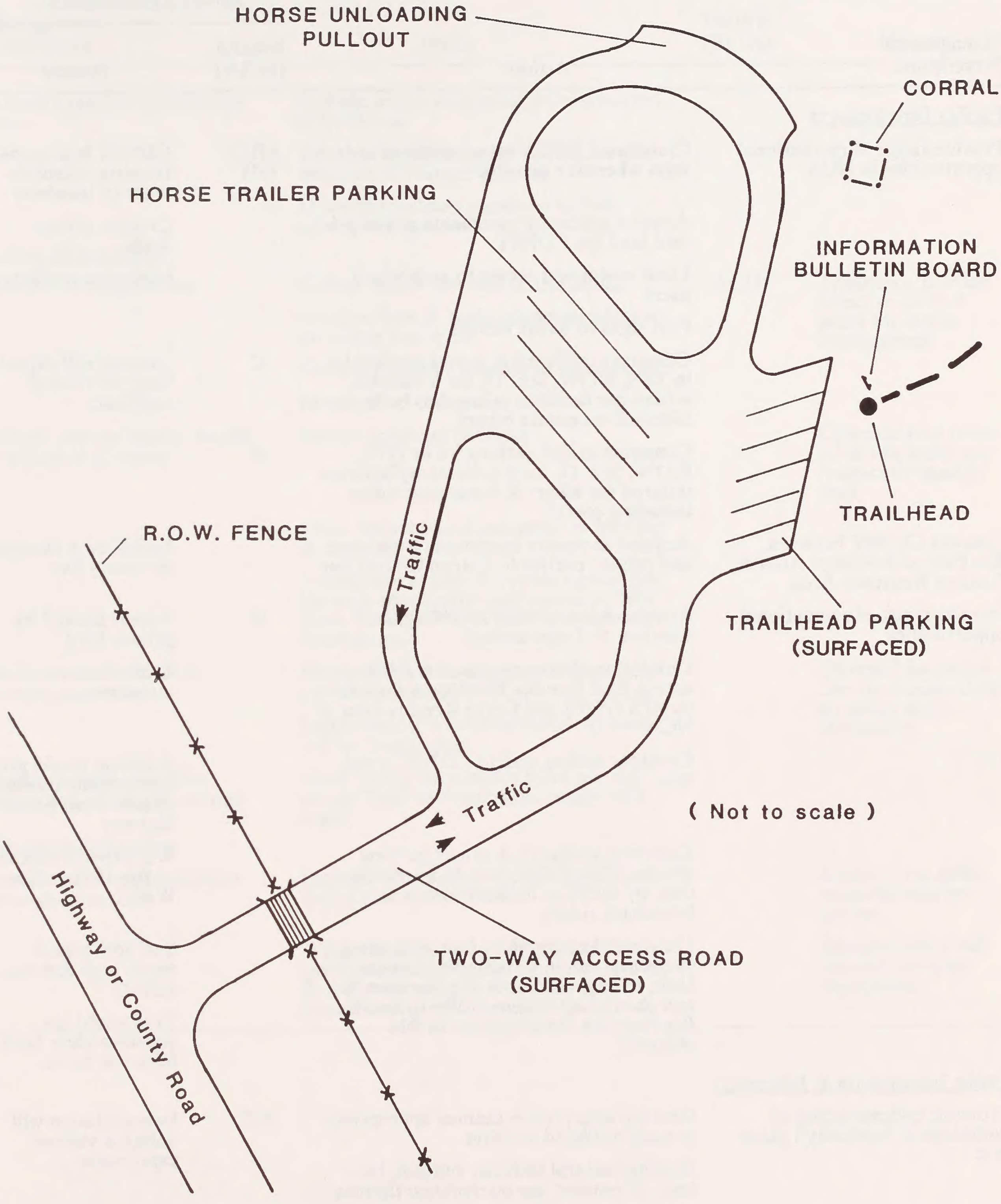


FIGURE 3-7
TYPICAL TRAILHEAD FACILITY TO ACCOMMODATE HORSEBACK RIDERS

TABLE 3-11
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR TRAILS

Management Prescription	Action	Affected Environment: Natural (BLUs)	Affected Environment: Human
Facility Development			
Provide range of recreational opportunities in NCA	Construct CDNST using existing roads & ways whenever possible	ABCF GH	CDNST legislation requires establishment of treadway
	Acquire necessary easements across private land for CDNST		Crosses private lands
	Limit motorized access to authorized users		Minimize conflicts
	Post signs to direct visitors		
	Construct trailhead & gravel parking lot in T8N, R13W, Sec. 13, for 6 vehicles w/day-use facilities tailored to both hikers & mountain bikers	C	Visitors will expect basic services at trailhead
	Construct gravel parking lot in T6N, R13W, Sec. 11, for 6 vehicles w/facilities tailored for hikers & horseback riders, including corral	A	
Connect CDNST between Rio Puerco Resource Area & Socorro Resource Area	Acquire necessary easements from state and private parties to Catron County line		Jurisdiction changes at county line
Provide range of recreational opportunities	Acquire select private inholdings in Cerritos de Jaspe subunit	G	Access limited by private land
	Develop trail in cooperation w/NPS to access East Rendija development (refer to NPS GMP) and Cerro Rendija area of NCA		Trail crosses monument
	Consider adding trail to CDNST treadway		Addition would provide primitive route distant from paved highway
	Construct trailhead & gravel parking area in T7N, R12W, Sec. 35 for 6 vehicles, w/ facilities for both hikers & horseback riders		Will provide access to Big Hole in the Wall
	Construct low-standard foot trail along sandstone rim in Cebolla Wilderness Unit, to begin at South Big Narrows & end above La Ventana (refer to South Big Narrows Development in this chapter)		Site now experiences high day-use activity Trail could not accommodate both hikers & horses
Public Information & Education			
Promote understanding of landscape & humanity's place in it	Develop interpretive themes appropriate to each trailhead location	ACI	Interpretation will enhance visitors' experience
	Develop natural historic, cultural, historic, & current use interpretive themes		

TABLE 3-11 -- CONCLUDED

Management Prescription	Action	Affected Environment Natural (BLUs)	 Human
Promote positive public land ethic	Provide public education & information at trailheads		
	Develop interpretive brochures for distribution at Ranger Station		
	Develop trailhead panels to include safety information		
Visitor Management			
Monitor recreation use	Collect visitor use data at trailheads	ACIJ	Trailheads provide effective control point for visitor management
	Analyze data & make recommendations on visitor use levels		
	Establish patrol schedule to monitor use		
	Monitor for change		
Protect visitors' safety, health, & personal property	Secure trailhead facilities		Concentrated recreation use areas are frequently vandalized
	Close concentrated use areas to hunting & trapping		
	Coordinate search-&-rescue operations through cooperative agreement w/NM State Police, NPS, & local law enforcement groups		
Maintain semi-primitive recreation setting	Limit visitor encounters to 6-10 per day on rim trail & CDNST		Demand for primitive recreation close to urban areas increasing
	Limit contact w/administrative personnel to emergencies		
Maintain semi-primitive motorized recreation setting	Limit visitor encounters to 14 per day along Chain of Craters mountain bike trails		
Resource Protection			
Provide resource protection through education	Include information on low-impact use techniques at trailheads		Information influences human behavior
	Wilderness trailheads will include interpretive theme of wilderness as resource, & wilderness test to emphasize low-impact use (pack-it-in, pack-it-out)		Interpretation will enhance visitors experience

Historic Homesteads: The Conservation Unit includes a number of interesting and well-preserved historic homesteads. Historic use and settlement in this area is an important theme that will be developed through on-site interpretation at one or more homesteads.

Final selection of the specific properties to be interpreted will be made after a more complete inventory and evaluation is done. However, information on the Roe Homestead is presented here as an example of the kinds of management prescriptions and actions that will be implemented.

The Roe Homestead dates from the 1930s and is situated near the mouth of Cebolla Canyon. The old house, several outbuildings, a root cellar, a corral, and other features make this homestead the most complete found to date in the NCA. This site offers an opportunity for visitors to experience another era of human occupation of this land.

TABLE 3-12
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR THE ROE HOMESTEAD
(Example Only)

Management Prescription	Action	Affected Environment: Natural (BLUs)	Affected Environment: Human
Facility Development			
Provide a range of recreational opportunities	Acquire access into Cebolla Canyon	A	Privately owned
	Continue exchange w/landowner		Existing road is dirt & slippery when wet
	Construct gravel all-weather road & 6-car parking lot		
	Construct trailhead		Refer to Appendix B, Summary of Land Protection Plan
	Construct interpretive trail through site		
Public Information & Education			
Promote understanding of landscape & humanity's place in it	Develop interpretive themes appropriate to Roe Homestead (e.g., when occupied, daily activities, reason no longer occupied)	A	Historical era
Resource Protection			
Provide resource protection	Inventory & map site	A	Structures need stabilization
	Stabilize structures		
	Monitor recreational use		

Wildlife Viewing Areas: Locations within or contiguous to the Conservation Unit can provide wildlife viewing areas for the visitor, including areas along maintained roads.

TABLE 3-13
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR WATCHABLE WILDLIFE

Management Prescription	Action	Affected Environment Natural (BLUs)	Affected Environment Human
Facility Development			
Provide wildlife viewing areas	Construct kiosk in T10N, R10W, Sec.2 to accommodate interpretation of high-desert ecosystem wildlife viewing (refer to Kiosk discussion)	E	Easy access from NM 53
	Construct pullout along CR 42 for viewing antelope	A	Easy access from maintained dirt road
	Consider a pullout in T6N, R12W, Sec. 18 where vegetation changes from shrub/conifer to grass/shrub		
	Identify other locations such as seasonal playas for consideration as wildlife viewing areas		
Public Information & Education			
Provide onsite interpretive opportunities	Include information on birds that frequent marshy habitat at north kiosk on NM 53	E	Information influences human behavior
	Erect interpretive panel at wildlife viewing area along CR 42	A	
	Include information on wildlife and geologic themes		Location also provides panoramic views of landscape
Resource Protection			
Provide for protection of scenic quality	Design and construct wildlife viewing areas to blend & harmonize w/natural landscape	AE	Visitors expect a predominantly natural landscape

WILDLIFE HABITAT

This section includes discussions of special use areas and species management.

Management Objectives for Wildlife Habitat

WILDLIFE HABITAT WILL BE MANAGED TO ENHANCE OR MAINTAIN THE CHARACTERISTICS OF THE BIOPHYSICAL LAND UNITS (BLUs; ECOTYPES) TO PRODUCE THE DESIRED HABITAT CONDITIONS THAT WILL SUPPORT THE VARIETY OF WILDLIFE SPECIES USING THE UNIT. THE HABITAT OF ALL WILDLIFE IN THE CONSERVATION UNIT WILL BE PROTECTED AS PART OF THE BLM's MULTIPLE USE PROGRAM.

Current Situation

Each animal species requires for its existence three elements: food, water, and cover. Food and water are required to sustain the basic functions of growth, maintenance, and reproduction. Cover is vegetation, space, or topography used by wildlife for protection from predators or the extremes of weather.

A habitat is a place where an animal finds the required combination of food, water, and cover to meet its biological needs. Different species of animals require different combinations of these three elements.

The Conservation Unit provides a wide variety of habitat types that support diverse populations of wildlife, including over 30 species of mammals, more than 60 species of birds for at least a part of the year, and many species of reptiles, amphibians, and invertebrates. (A complete list of vertebrate species likely to occur in the NCA is found in Appendix G. This appendix provides specific information about what species are likely to occur in each BLU and what special habitat features or attributes of that BLU are important to each species.)

Habitat types in the Conservation Unit are dispersed over the landscape in a patchwork pattern that provides large areas of edge where one habitat type blends into another. The large number and size of these edge areas in the unit adds to the habitat complexity and increases wildlife species diversity.

The diverse habitats of the NCA support complex plant communities. A plant community is a unique combination of plants that reflects the environmental influences on a site, such as soil, temperature, elevation, slope, aspect, and rainfall as they influence vegetation. A brief description of the plant communities that are represented in each BLU is found in Table 3-5 in the Range Management section of this chapter. (A preliminary list of plant species in the NCA is found in Appendix L. Future studies may identify plants of special status.)

The BLM is charged with maintaining wildlife habitat while allowing other uses to continue. National Conservation Area designation confers the responsibility to protect the complex wildlife habitats for all the rich variety of wildlife they support.

The BLM presently lacks the information needed to set specific management prescriptions and actions for wildlife habitat in the NCA to the same extent reflected for other resource issues in the GMP. Boundaries recently established for the NCA include areas that have not been surveyed for habitat, or are not part of a developed BLM Habitat Management Plan. Only a partial list of special habitat features is available. This limits the amount of analysis that can be done before specific management prescriptions and actions can be outlined.

In some cases, inventory will be needed before management prescriptions can be developed to maintain the diverse habitats Congress recognized as one of the NCA's natural resources. As these information gaps are filled by inventory and analysis, appropriate prescriptions and actions will be generated.

The BLU (ecotype) zoning concept used in the GMP is especially useful to wildlife habitat managers who lack inventory information. (Refer to Chapter 1 for an explanation of the BLU zoning concept.) Map A displays the BLUs in the NCA, which reflects its habitat complexity. Regardless of where it is located in the NCA, a particular BLU supports similar wildlife species diversity and density, and responds to management actions in a similar manner. Therefore, the BLUs can be used as a guide for deciding where and how habitat enhancement, maintenance, and protection measures should be implemented. The BLUs are comparable to the standard habitat site descriptions developed through the Integrated Habitat Inventory Classification System, which was prepared for parts of the El Malpais NCA in 1980.

The management prescriptions and actions in this document are designed to enhance or maintain the characteristics of a BLU to produce desired habitat conditions and protect wildlife species present in the NCA. Objectives developed in the BLM El Malpais Habitat Management Plan (1981) have been evaluated and incorporated into GMP management prescriptions as appropriate.

Additional inventory will be used as available for more detailed analysis of certain wildlife species and habitats. Management prescriptions and actions developed for a particular BLU will aid in narrowing the scope of such inventory, thus channeling available funds into those areas most likely to benefit.

Special Use Areas: Certain habitat types are especially important to wildlife because they are in limited supply, provide essential combinations of habitat factors during critical portions of a life cycle, or allow protected access to preferred habitats during seasonal migrations. These important habitat types are termed "special use areas." BLM policy is to protect special use areas, especially riparian habitat and habitat for special status species. The BLM will consider these areas before allocating resources in the Conservation Unit.

In habitats with brush and woodland components, maintenance of snags, dead and down trees, slash piles, and old growth will be considered. In areas where soils are deep enough to support burrowing mammals, management will reflect the maintenance of appropriate habitat. In grasslands, the forage needs of wildlife will be balanced with range management needs.

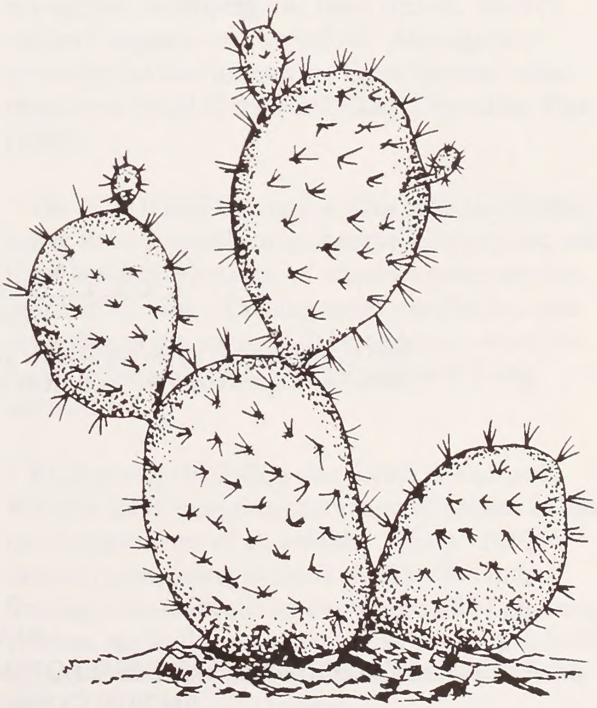
Both BLU B and BLU I exhibit soils with moderate to severe erosion potential that causes a loss of habitat in those areas where the BLUs occur. Although these soils constitute a small percentage of the unit, their possible impact on special use areas must be assessed on a regular basis and cost-effective mitigating measures applied. Monitoring will also provide data not currently available to help in assessing any causes for erosion beyond that occurring under natural climatic conditions.

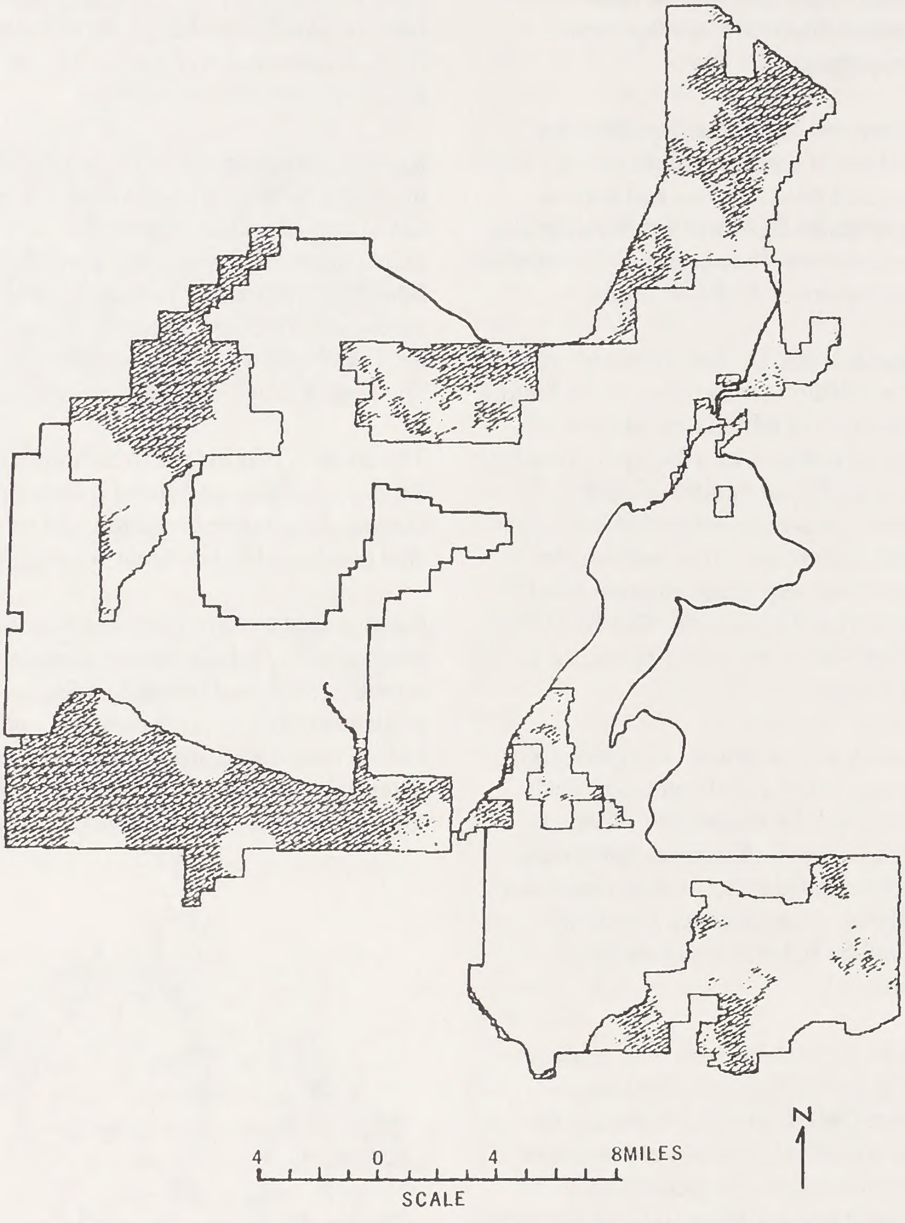
Water availability for wildlife is limited throughout the Conservation Unit, making all waters special use areas by definition. One wildlife water and exclosure have been completed in the Cerro Brillante subunit for antelope, and additional waters have been proposed (USDI, BLM 1981). Map 3-6 shows areas where additional wildlife waters could be developed. (Note: These areas are on non-erodible soils on slopes between 1 and 15 percent, are greater than 2 miles from other waters, and lie in BLUs that are likely to support deer and antelope.) Water developed primarily for livestock also benefits wildlife. A table of wildlife habitat projects proposed for the NCA is contained in Chapter 11, the Wildlife Resources Management Plan.

Species Management: The proposed management prescription and actions for species management have been coordinated with the New Mexico Department of Game and Fish (NMDG&F). The NMDG&F manages hunting seasons for mule deer, pronghorn antelope, black bear, turkey, mourning dove, and Abert's squirrel in the Conservation Unit. Hunting of these animals will continue.

The BLM is committed to establishing and reading habitat condition and trend transects on big game ranges. Vegetative condition and trend studies are also conducted in key areas on grazing allotments.

Factors used to determine habitat condition for many game species include the presence or absence of key browse, cover, and forage species, as well as their availability, density, composition, and vigor. Other factors considered are soil stability and erosion potential. Two BLUs, B and I, have highly erodible soils, so erosion control measures may be needed.





(NOTE: Shaded areas are on non-erodible soils on slopes of 1 - 15%, are more than 2 miles from other waters, and lie in BLUs that are likely to support deer and antelope.)

MAP 3-6
AREAS APPROPRIATE FOR DEVELOPMENT OF ADDITIONAL WILDLIFE WATERS
IN THE CONSERVATION UNIT

If the condition and trend of browse, cover, or forage is determined to be unsatisfactory, the BLM can use many techniques to improve them. Maintaining or improving habitat condition where feasible is basic to protecting the health of habitat and the wildlife species that depend on it.

BLM policy encourages management of raptor habitats on public lands by developing habitat and prey management considerations during the planning process. The BLM recognizes the perpetuation of waterfowl diversity and abundance as an international resource, and manages wetlands and habitats such as playas and large livestock retention dams on public lands to this end.

The Conservation Unit offers potential habitat for a variety of species that have special status. Federal endangered species known or likely to occur in the Conservation Unit include bald eagles and peregrine falcons, which occur occasionally. Prairie dog towns in the unit have been surveyed for the endangered black footed ferret, with no ferrets being discovered. These surveys are ongoing. The potential for reintroduction of special status species in the unit will be assessed.

Five animal species being considered for inclusion on the federal special status list may occur in the Conservation unit. These include the southern spotted owl, the white-faced ibis, the mountain plover, the spotted bat, and the ferruginous hawk. (A list of special status species that include El Malpais in their range of occurrence or possible habitat is found in Appendix H. The special habitat features that attract each species are identified.)

In addition, the BLM is considering the reintroduction of desert bighorn sheep (a state endangered species) into portions of the NCA. Feasibility studies to determine habitat quality and potential management conflicts will be conducted by the BLM in cooperation with the NMDG&F.

Assumptions

* The BLM has a broad interest in protecting the habitat of all wildlife as part of its overall multiple use program, and in optimizing the populations and diversity of wildlife found in the NCA.

* The BLM is committed to conducting habitat inventories, monitoring, protection, maintenance, and enhancement activities on public lands in the NCA in cooperation with the state and other agencies.

* Specific monitoring needs for determining the condition of habitats will be established for the NCA.

* Hunting and trapping will continue in the Conservation Unit as regulated by the NMDG&F.

* Funding will be available to implement this plan.

Policy

* Federal regulations protect raptors and migratory birds such as waterfowl, mourning dove, and other non-game birds.

* Federal and state regulations protect special status species.
* Fish and Wildlife 2000 (USDI,BLM 1988) contains BLM policy designed to guide fish and wildlife management into the year 2000.

* The proposed management prescriptions and actions for wildlife habitat are designed to meet the requirements of the Sikes Act (PL 93-452) and New Mexico's "Share with Wildlife" program.

* BLM policy supports state management plans for those game species that state law defines to be of economic or public value. Species emphasized in the Conservation Unit because of state interest include pronghorn antelope, mule deer, turkey, Abert's squirrel, raptors, and waterfowl. Management prescriptions and actions for these species reflect objectives found in the NMDG&F Operation Plan (1987).

* The NMDG&F Operation Plan calls for wildlife water to be available at an interval of every two sections in wildlife habitats of ungulate game species found in the unit. Existing water distribution and reliability of the source will be reviewed when the location for additional wildlife waters is being determined.

* BLM policy (including that found in Fish and Wildlife 2000) supports protection of habitat to meet the requirements of all wildlife. This protection involves completing projects to eliminate major limiting factors identified during the BLM planning process, maintaining or increasing habitat productivity, and enhancing public understanding of wildlife and its relationship to habitat.

* The Federal Land Policy and Management Act (1976) and the BLM Rio Puerco Resource Management Plan (1986) include policy to provide for habitat for wildlife.

* The El Malpais legislation provides minimal water rights for the NCA.

Management Prescriptions and Actions for Wildlife Habitat

Special Use Areas: The following table lists the management prescriptions and actions proposed for special uses areas in the Conservation Unit.

TABLE 3-14
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR SPECIAL USE AREAS

Management Prescription	Action	Affected Environment	
		Natural (BLUs)	Human
Restrict human impacts to areas occupied by wildlife for breeding, birthing, migration, cover, & winter use	Survey to identify these areas before conflicts occur	All	Consider sensitive areas when creating trails; redirecting recreators may be necessary
	Make management decisions that deter conflicts before they occur		
Restrict human impacts to wildlife during sensitive times of their life cycles (birthing, breeding, migration, winter use)	Survey to determine these times before conflicts occur		
Protect patchwork character of existing habitats	Use fire to maintain patchwork and to deter damaging fires	CDJ	
	Allow removal of selected dead & down wood for home use, opening areas of no more than 200 acres on west side of unit		Removal of fuelwoods for home use will benefit habitat
	Monitor for erosion in sensitive areas	BI	
Protect against loss of habitat through erosion	Seed native or endemic species onto slopes identified as sensitive where soil loss threatens	I	
	Encourage growth of cover species in drainages	B	
	Use active erosion control, build check dams, or take other appropriate actions where necessary to prevent loss of cover		
Protect all drainages, wetlands, & playas	Manage these areas as sensitive habitat	ABE	Potential conflicts between habitat management & range management
	Establish cooperative agreements w/allottees to limit cattle access		
	Acquire private lands w/in NCA boundaries that contain these resources		
Protect species diversity	Deter destruction of identifiable special use sites such as raptor aeries, snake dens, mammal burrows, wildlife trees, down rotting logs, prairie dog towns	All	May need to educate allottees & recreators about special use sites
	Survey to determine old growth areas that may be managed for southern spotted owls	GHIJ	

Species Management: Table 3-15 contains the proposed prescriptions and actions for managing wildlife species in the Conservation Unit.

TABLE 3-15
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR SPECIES MANAGEMENT

		Affected Environment	
Management Prescription	Action	Natural (BLUs)	Human
Continue cooperation w/NMDG&F in managing game species	Continue to provide input to NMDG&F regarding hunting & trapping	All	Recommended population sizes should attract hunters, photographers & other wildlife viewers
	Manage forage & browse condition to support recommended population sizes of species regulated by NMDG&F, as stated in their Operations Plan (1987)		
	Maintain existing wildlife waters & exclosures	ACDH IK	
	Conduct inventory to determine where additional waters may benefit wildlife	All	
	Develop additional waters for game in areas where available waters are more than 2 miles apart (refer to Map 3-5)	ACHK	
	Pursue cooperative agreement(s) to consider feasibility of reintroducing desert bighorn sheep	I	
Protect all wildlife	Maintain visible BLM presence through patrols	All	Encourage positive interaction between wildlife, hunters, & other visitors
	Continue "Operation Respect"	All	
	Allow fuels reduction (using fire) & collection of dead/down wood for home use where surveys indicate habitat would benefit	CGH	
	Protect against loss of soils in sensitive areas through erosion control	BI	
Protect songbirds, insectivorous birds, raptors, & special status species	Develop cooperatively funded management efforts w/NM "Share with Wildlife" Program	All	
	Survey for habitat to protect & maintain it		
Protect hole nesting wildlife	Deter cutting of dead standing wildlife trees	CDGH IJK	Recreators & home fuelwood permittees must be discouraged from cutting such trees
	Survey for old growth and limit fires to maintain habitat	GHIJ	
	Manage old growth for recruitment of live cavity nesting trees		
Protect waterfowl populations & diversity	Protect playas, large stock ponds, & wetlands through cooperative agreements w/private owners or allottees	ABCE	
	Acquire private lands contiguous w/unit that contain waterfowl habitat		
Protect raptor populations	Survey to determine raptor nesting areas & discourage recreational use there	All	Many raptors are easily disturbed by people
	Deter loss of habitat critical to raptor food supply	All	
	Maintain prairie dog towns and burrowing mammal habitat	ABC	

RANGE MANAGEMENT

This section includes discussions of forage/desired plant communities, range improvements, and water availability.

Management Objectives for Range Management

RANGE WILL BE MANAGED TO ACHIEVE AND MAINTAIN DESIRED PLANT COMMUNITIES AND TO CONSERVE THE WATER SUPPLY THAT LIVESTOCK MANAGEMENT RELIES ON, WHILE PROTECTING THE NATURAL RESOURCES, WILDLIFE HABITAT, AND RECREATIONAL VALUES FOUND IN THE UNIT.

Current Situation

Biophysical Land Units (BLUs) are used to discuss range management in this GMP. The basic components of each BLU (soil, landform, vegetation, and surface water) provide a natural classification of lands that contains no preconceptions about their use. This lack of preconceptions helps to eliminate bias from recommended prescriptions and actions. Information about each BLU's suitability for livestock or wildlife uses, its vulnerability to erosion or to other surface-disturbing actions can be obtained from this basic classification.

The soils that are a component of the BLUs are the same soils represented by the ecological range sites that have traditionally been used for range management. Ecological range sites are identified by their soils, and allow managers to project a potential vegetation community associated with those soils. The BLUs identify present vegetation and reflect existing range condition.

Table 3-16 relates the traditional ecological range sites to the BLUs used to determine management objectives for this unit. The table lists the allotments, the BLUs and total acreage of each in the allotments, expected vegetation (range site) in each BLU of each allotment, the existing plant community in each BLU, and the ecological condition of each allotment.

Nineteen plant communities have been documented in the BLUs through recent inventories conducted by the US Forest Service's Rocky Mountain Forest and Range Experimental Station (Francis & Williams 1988). This information will be used with the BLUs and ecological range sites to determine desired plant communities for the unit.

TABLE 3-16
ECOLOGICAL AND VEGETATIVE INFORMATION FOR ALLOTMENTS OVERLAPPING THE CONSERVATION UNIT

Allotment Number	BLU	Acres	% of Unit	Potential Vegetative Community*	Existing Plant Community**	Category***
200	A	291	1.6	Grass shrub/mixed conifer grass forb	Grass shrub	I
	C	927	5.2	Mixed conifer/grass shrub	Shrub conifer/pinon juniper	
	H	373	2.1	Mixed conifer/grass shrub	Mixed conifer	
	K	2	0.01		Ponderosa parkland/ deciduous	
201	A	1,094	4.8	Grass forb/grass shrub mixed conifer	Fringed sage, snakeweed, blue grama*	M
	B	27	0.1	Grass shrub/pinon juniper increasing to rabbitbrush	Sparse bare	
	C	1,918	8.3	Mixed conifer/grass shrub	Shrub conifer	
	D	91	0.4	Ponderosa parkland/ ponderosa Douglas fir/pinon juniper shrub/oak shrub	Shrub conifer	

TABLE 3-16 -- CONTINUED

Allotment Number	BLU	Acres	% of Unit	Potential Vegetative Community*	Existing Plant Community**	Category***
	G	2,385	10.4	Ponderosa parkland/ ponderosa Douglas fir oak shrub/mixed conifer	Ponderosa pine, mt. muhly, blue grama, muttongrass, pine dropseed*	
	H	1,470	6.4	Mixed conifer/grass shrub/mixed conifer	Ponderosa pine, Apache plume, blue grama*	
	I	2,614	11.4	Pinon juniper/grass shrub ponderosa oak	Grass shrub/shrub conifer/mixed conifer	
	K	57	0.3		Ponderosa parkland/deciduous	
202	C	7	1.2	Mixed conifer/grass shrub	Shrub conifer	M
	H	37	6.0	Mixed conifer/grass shrub	Mixed conifer	
	I	524	85.4	Pinon juniper/grass shrub ponderosa oak/pinon	Grass shrub/shrub conifer/mixed conifer	
	K	44	7.2	Mixed conifer/grass shrub mixed conifer	Ponderosa parkland/deciduous	
203	A	16,094	7.9	Grass forb/grass shrub mixed conifer	Oneseed juniper, snakeweed, blue grama, mallow, bluestem wheatgrass*	I
	B	1,033	0.5	Grass shrub/pinon juniper grass shrub	Oneseed juniper, blue grama, sand dropseed*	
	C	344	0.3	Mixed conifer/grass shrub	Shrub conifer	
	D	59	0.03	Ponderosa parkland/ ponderosa Douglas fir/pinon juniper/oakshrub/rock outcrop	Horsebrush, snakeweed, Hymenopappus, blue grama*	
	G	57	0.03	Woodland, rock outcrop	Ponderosa pine, mt. muhly, blue grama, pine dropseed, mallow, Apache plume*	
	H	1,735	0.9	Mixed conifer/grass shrub mixed conifer	Mixed conifer	
	I	5,808	2.9	Pinon juniper/grass shrub ponderosa oak/grass shrub pinon	Grass shrub/shrub conifer/mixed conifer	
	J	2,451	1.2	Ponderosa Douglas fir/oak shrub	Grass shrub/shrub conifer/mixed conifer	
	K	361	0.2		Ponderosa parkland/deciduous	
204	A	884	9.1	Grass forb/grass shrub mixed conifer	Grass shrub	M
	B	408	4.2	Grass shrub/pinon juniper increasing to rabbitbrush	Sparse bare/grass shrub	
	C	173	1.8	Mixed conifer/grass shrub	Shrub conifer	
	D	109	1.1	Ponderosa parkland/pinon juniper shrub/oak shrub	Shrub conifer	

TABLE 3-16 -- CONTINUED

Allotment Number	BLU	Acres	% of Unit	Potential Vegetative Community*	Existing Plant Community**	Category***
	G	128	1.3	Ponderosa Douglas fir/oak shrub/pinon juniper mixed conifer	Mixed conifer	
205	A	838	4.0	Grass forb/grass shrub mixed conifer	Grass shrub	I
	B	1,208	5.7	Pinon juniper/grass shrub	Sparse bare/grass shrub	
	C	49	0.2	Mixed conifer/grass shrub	Shrub conifer	
	D	20	0.1	Ponderosa parkland/ ponderosa Douglas fir/pinon juniper shrub/oak shrub	Shrub conifer	
	G	30	0.1	Ponderosa parkland/ ponderosa Douglas fir/oak shrub/pinon juniper/mixed conifer	Mixed conifer	
	H	5	0.02	Mixed conifer/grass shrub	Mixed conifer	
	I	2,572	12.1	Pinon juniper/grass shrub ponderosa oak/pinon	Grass shrub/shrub conifer/mixed conifer	
206	A	210	5.6	Grass shrub/grass forb mixed conifer	Grass shrub	M
	B	17	0.5	Grass shrub/pinon juniper	Sparse bare/grass shrub	
	C	282	7.5	Mixed conifer/grass shrub mixed conifer	Shrub conifer	
	D	15	0.4	Ponderosa parkland/ ponderosa Douglas fir/pinon juniper shrub	Shrub conifer	
	G	398	10.6	Mixed conifer/pinon juniper ponderosa parkland/oak shrub	Mixed conifer	
	H	143	3.8	Mixed conifer/grass shrub	Mixed conifer	
	I	62	1.7	Pinon juniper/ponderosa oak grass shrub/pinon	Grass shrub/shrub conifer/mixed conifer	
207	A	4,861	21.2	Grass forb/grass shrub mixed conifer	Grass shrub	I
	C	11,621	50.6	Grass shrub/pinon juniper shrub/mixed conifer	Shrub conifer	
	H	1,236	5.5	Mixed conifer/pinon juniper shrub/mixed conifer/grass shrub	Mixed conifer	
	I	136	0.6	Pinon juniper/grass shrub ponderosa oak	Grass shrub/shrub conifer/mixed conifer	
	K	2	0.01		Ponderosa parkland/deciduous	
208	A	5,204	17.5	Grass forb/grass shrub mixed conifer	Grass shrub	I

TABLE 3-16 -- CONTINUED

Allotment Number	BLU	Acres	% of Unit	Potential Vegetative Community*	Existing Plant Community**	Category***
	B	907	3.0	Grass shrub/pinon juniper	Sparse bare/grass shrub	
	C	1,028	3.5	Pinon juniper shrub/mixed conifer/grass shrub	Shrub conifer	
	D	418	1.4	Ponderosa parkland/ ponderosa Douglas fir/oak shrub	Shrub conifer	
	E	267	0.9	Alkali grass/grass forb grass shrub	Alkali grass/grass shrub	
	G	793	2.7	Ponderosa parkland/ponderosa Douglas fir/oak shrub/mixed conifer	Mixed conifer	
	H	514	1.7	Mixed conifer/pinon juniper shrub	Mixed conifer	
	I	991	3.3	Pinon juniper/grass shrub ponderosa oak/pinon	Grass shrub/shrub conifer/mixed conifer	
209	A	4,431	14.4	Grass shrub/grass forb mixed conifer	Grass shrub	I
	B	205	0.8	Grass shrub/grass shrub pinon juniper	Bluestem wheatgrass, blue grama*	
	C	3,259	10.6	Grass shrub/mixed conifer	Shrub conifer	
	D	69	0.2	Ponderosa parkland/ponderosa Douglas fir/oak shrub/pinon juniper shrub	Shrub conifer	
	G	336	1.1	Ponderosa parkland/ponderosa Douglas fir/oak shrub/pinon juniper shrub	Mixed conifer	
	H	4,809	15.6	Mixed conifer/grass shrub mixed conifer	Mixed conifer	
	I	4,352	14.2	Pinon juniper/grass shrub ponderosa oak/grass shrub pinon	Pinon pine, oak*	
	J	4,141	13.5	Ponderosa Douglas fir/oak shrub	Grass shrub/shrub conifer/mixed conifer	
	K	815	2.7		Ponderosa/deciduous	
210	A	2,318	4.0	Grass forb/grass shrub mixed conifer	Grass shrub	I
	C	9,000	21.9	Mixed conifer/grass shrub	Pinon pine, oneseed juniper, blue grama, snakeweed, lichen*	
	D	232	0.6	Ponderosa parkland/ponderosa Douglas fir/pinon juniper shrub/oak shrub	Horsebrush, snakeweed, blue grama, Hymenopappus*	

TABLE 3-16 -- CONCLUDED

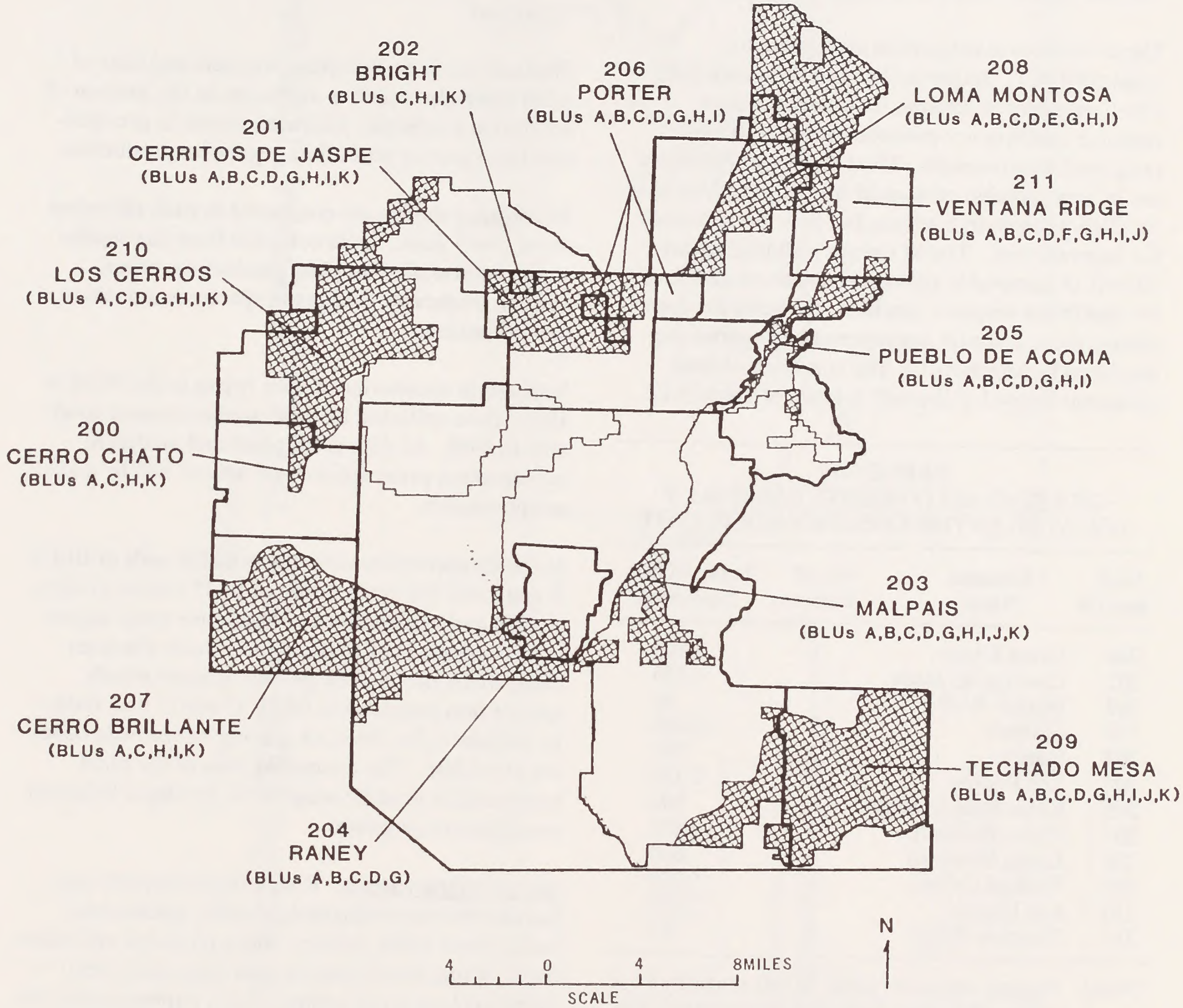
Allotment Number	BLU	Acres	% of Unit	Potential Vegetative Community*	Existing Plant Community**	Category***
	G	210	0.4	Ponderosa parkland/ponderosa Douglas fir/pinon juniper shrub/oak shrub/mixed conifer	Mixed conifer	
	H	6,318	15.4	Mixed conifer/grass shrub	Mixed conifer	
	I	79	0.2	Pinon juniper/grass shrub, ponderosa oak/pinon	Pinon pine, oak*	
	K	20	0.05		Ponderosa/deciduous	
211	A	138	1.0	Grass shrub/mixed conifer/grass forb	Grass shrub	I
	B	427	3.0	Grass shrub/pinon juniper increasing to rabbit brush	Sparse bare/grass shrub	
	C	57	0.4	Mixed conifer/grass shrub	shrub conifer	
	D	82	0.6	Ponderosa parkland/ponderosa Douglas fir/pinon juniper/oak shrub	shrub conifer	
	F	828	6.0		Lava/grass shrub	
	G	114	0.5	Ponderosa parkland/ponderosa Douglas fir/oak shrub/mixed conifer	mixed conifer	
	H	59	0.5	Mixed conifer/grass shrub	Mixed conifer	
	I	712	5.0	Pinon juniper/grass shrub/ponderosa oak	Grass shrub/shrub conifer/mixed conifer	
	J	74	0.6	Ponderosa Douglas fir/oak shrub	Grass shrub/shrub conifer/mixed conifer	

Notes: *As identified in the Soil Conservation Service's National Range Handbook (1976).
** Existing plant community was determined by transect surveys.
Additional transect surveys should provide more detailed information about other allotment sites.
***I = Improve; M = Maintain.

Map 3-7 identifies the boundaries of the 12 grazing allotments that occur in the Conservation Unit in relationship to the BLUs. Several allotments extend into more than one management subunit in the Conservation Unit, into other management units, or into the National Monument. Each allotment contains more than one BLU, adding to the complexity of managing the range resource in the NCA.

Table 3-17 lists the allotments partially located in the unit, with animal unit months (AUMs) permitted in each entire allotment (including areas outside the NCA). An AUM represents the amount of forage necessary to sustain one cow or its equivalent for a period of 1 month. Grazing one cow for 10 months on an allotment is equivalent to 10 AUMs, while grazing 10 cattle for 1 month also is equivalent to 10 AUMs.

Domestic grazing of both sheep and cattle has taken place in the Conservation Unit for over 100 years (Mangum 1988), but current grazing permits and leases are limited to horses and cattle. All agreements between allottees and the BLM for grazing allotments within the Conservation Unit follow guidelines contained in the Rio Puerco Resource Management Plan (1986) and the Rangeland Management Program (1982).



MAP 3-7
GRAZING ALLOTMENTS OVERLAPPING THE CONSERVATION UNIT
IN RELATIONSHIP TO BIOPHYSICAL LAND UNITS

All grazing allotments in the Rio Puerco Resource Area have been placed into one of three selective management categories. The purpose of these categories is to focus management attention on those allotments where making changes in management practices and/or stocking levels could produce cost-effective improvement in ecological condition.

These selective management categories are: "Custodial (C)", "Improve (I)", and "Maintain (M)". The C category allotments have no significant resource conflicts nor potential for cost-effective rangeland improvement. The I category allotments are in unacceptable ecological condition and/or have significant resource conflicts, but have the potential for improvement. The M category allotments are already in acceptable ecological condition and have no significant resource conflicts. (Criteria for determining these selective management categories are displayed in Appendix I.) The condition of each allotment located in the unit is listed in Table 3-17.

TABLE 3-17
GRAZING ALLOTMENTS PARTIALLY LOCATED IN THE CONSERVATION UNIT

Allotment#	Allotment Name	No. of Pastures	Total AUMs Permitted*
200	Cerro Chato	1	2,765
201	Cerritos de Jaspe	3	1,336
202	Brights Well	1	48
203	Malpais	15	13,898
204	Raney	1	302
205	Los Pilares	5	2,134
206	Little Hole in Wall	2	108
207	Cerro Brillante	7	4,081
208	Loma Montosa	6	600
209	Techado Mesa	6	5,279
210	Los Cerros	7	2,202
211	Ventana Ridge	3	387

*Note: Figures represent total AUMs permitted for entire allotment, including areas outside the NCA.

Forage and Desired Plant Communities: Improving the quality and quantity of forage is a recognized focus of livestock grazing management. Such improvement results from managing for a desired community of plant species and for species productivity.

Management techniques in the Conservation Unit vary among allottees, and each allotment is likely to reflect a different combination of management practices that affect forage quality and quantity. Practices such as the amount of time and season that the range is grazed each year, the number of cattle grazed, feeding methods, the number of waters and their locations, the number of pastures in an allotment, and how cattle are moved between pastures all affect vegetation.

Fluctuations in precipitation amounts and time of occurrence also result in variations in the amount of vegetation produced. Likewise, trends in precipitation from year to year affect vegetative production.

Monitoring studies are conducted in each allotment every 1 to 5 years. Data collected from the studies supply information on plant production, cover, density, frequency, changes in species composition, and utilization.

Vegetation monitoring studies began in the NCA in 1985. Data collected by these studies became available in 1989. As data is collected and analyzed, management prescriptions and actions will be added as appropriate.

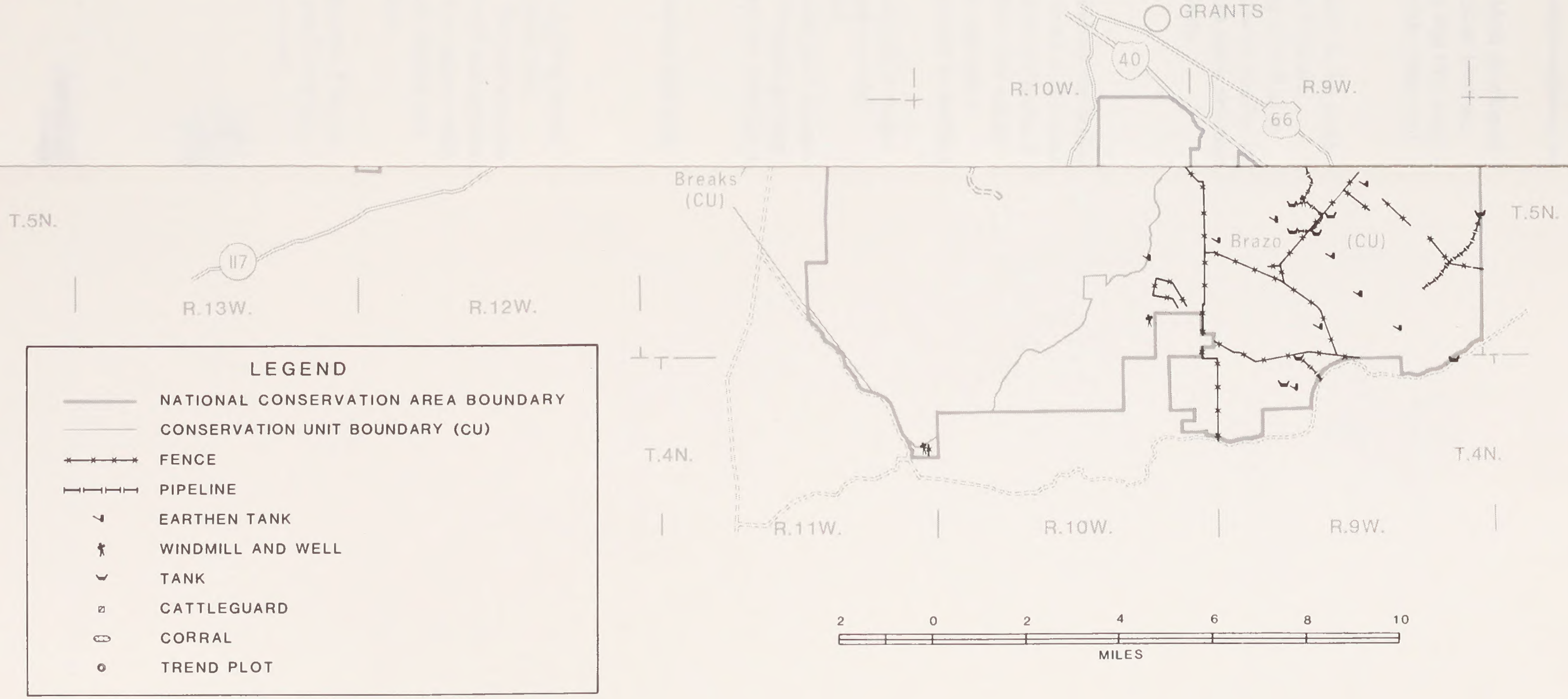
In the Conservation Unit, the erodible soils of BLUs B and I and the steep slopes of BLU I make erosion control and maintenance of vegetative cover important components of range management wherever these BLUs occur. The growth of some woody species into grassland in BLUs C and D may reduce its usefulness for livestock grazing but provide benefits to wildlife. The competing uses of the plant communities must be weighed to develop a balanced management program.

Range Improvements: Range improvements may include fences, cattleguards, corrals, catchments, wells, metal tanks, earthen tanks, pipelines, retention dams, spring developments, and vegetation treatments such as brush control. Such improvements are required for proper range management, and are authorized by permits and cooperative agreements between the BLM and allottees. Many of the range improvements on public land in the Conservation Unit have been privately funded and represent private property. Map 3-8 displays existing range improvements in the unit.

Surface water is a very limited resource in the NCA. Developed ground waters provide the only permanent supply for cattle and wildlife in large areas, especially in the Cerro Brillante, Cerritos de Jaspe,

MAP 3-8

RANGE IMPROVEMENTS IN THE CONSERVATION UNIT



All grazing allotments in the Rio Puerco Resource Area have been placed into one of three selective management categories. The purpose of these categories is to focus management attention on those allotments where making changes in management practices and/or stocking levels could produce cost-effective improvement in ecological condition.

These selective management categories are: "Custodial (C)", "Improve (I)", and "Maintain (M)". The C category allotments have no significant resource conflicts nor potential for cost-effective rangeland improvement. The I category allotments are in unacceptable ecological condition and/or have significant resource conflicts, but have the potential for improvement. The M category allotments are already in acceptable ecological condition and have no significant resource conflicts. (Criteria for determining these selective management categories are displayed in Appendix I.) The condition of each allotment located in the unit is listed in Table 3-17.

TABLE 3-17
GRAZING ALLOTMENTS PARTIALLY LOCATED IN THE CONSERVATION UNIT

Allotment#	Allotment Name	No. of Pastures	Total AUMs Permitted*
200	Cerro Chato	1	2,765
201	Cerritos de Jaspe	3	1,336
202	Brights Well	1	48
203	Malpais	15	13,898
204	Raney	1	302
205	Los Pilares	5	2,134
206	Little Hole in Wall	2	108
207	Cerro Brillante	7	4,081
208	Loma Montosa	6	600
209	Techado Mesa	6	5,279
210	Los Cerros	7	2,202
211	Ventana Ridge	3	387

*Note: Figures represent total AUMs permitted for entire allotment, including areas outside the NCA.

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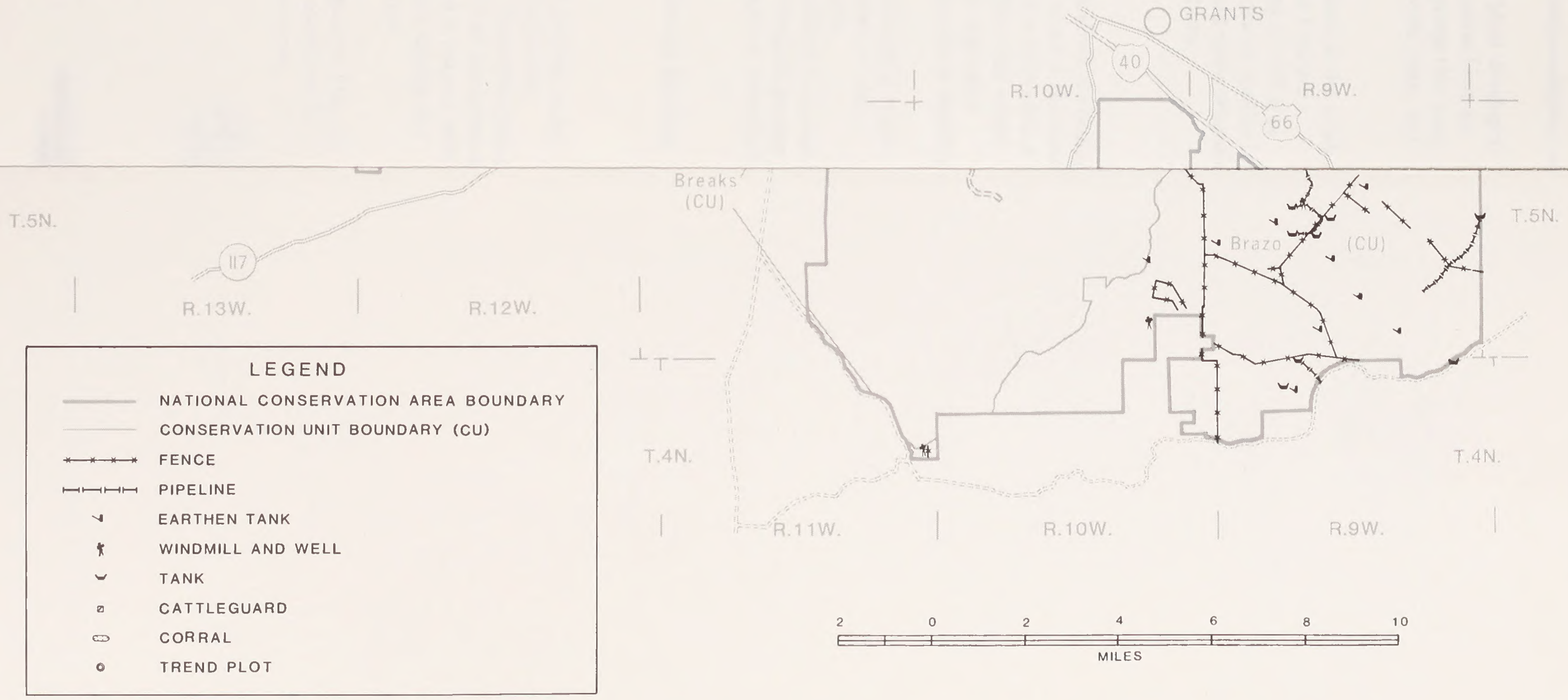
MAP 3-8

RANGE IMPROVEMENTS IN THE CONSERVATION UNIT



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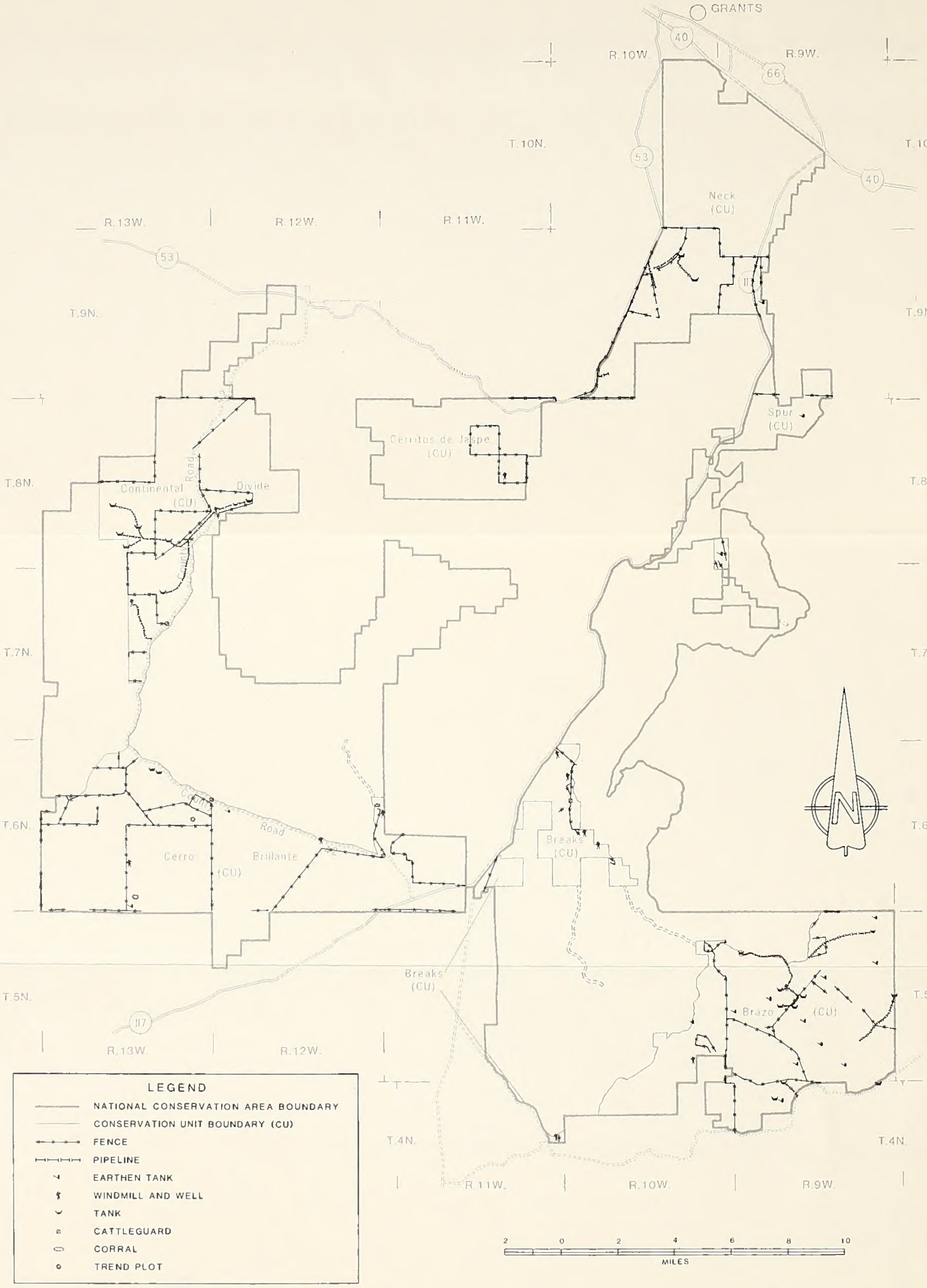
MAP 3-8

RANGE IMPROVEMENTS IN THE CONSERVATION UNIT



and Continental Divide subunits. Most developed ground waters within the Conservation Unit are located on private lands. Small springs that have been developed for cattle also provide water and riparian habitat for wildlife.

Earthen tanks located on private land in the southeastern corner of the Conservation Unit are attractive to recreators for camping as well as to cattle. This situation presents a possible conflict in uses that must be taken into account when proposing management prescriptions and actions.

Assumptions

* Monitoring provides information about the ecological condition of the range and the trend in this condition. This information can be used to determine a desired plant community in each BLU that would provide forage while protecting the vegetative components necessary to wildlife species in the NCA.

* Changes in management practices and/or reductions in allowable livestock grazing use on the "Improve" category allotments would:
(1) ensure improved ecological condition to acceptable levels, (2) provide forage for livestock grazing use and wildlife habitat, and (3) improve watershed conditions.

* Funding will be available to implement this plan.

Policy

* The El Malpais legislation allows grazing to continue in the NCA and outlines the protection expected for the NCA's resources. Resource conservation must be a primary concern in all management decisions. Grazing will be managed in balance with other uses, such as protecting wildlife habitat and providing for recreation opportunities.

* The Rio Puerco Resource Management Plan outlines desired grazing management conditions for BLM lands, including range improvements.

* Allotment Management Plans (AMPs) specify objectives and grazing prescriptions for each allotment.

* The BLM will encourage the development and maintenance of a desired plant community in each BLU. Studies will determine desired plant communities that benefit both livestock and wildlife management.

* Data derived from monitoring studies will be used to make management decisions about livestock grazing practices and stocking rates for an allotment.

* The Rio Puerco Resource Management Plan (RMP) provides for changes in management and/or reductions in allowable livestock grazing use on the "Improve" (I) category allotments. Management practices also can be changed on the "Maintain" (M) category allotments if resource conflicts are identified.

* Selective management categories may be changed in the future as vegetation communities change or use conflicts are resolved for the "I" allotments.

* Any "M" allotments that are converted to the "I" category will be managed in accordance with the objectives of the Rio Puerco RMP.

Management Prescriptions and Actions for Range Management

Forage and Desired Plant Communities: Table 3-18 lists the management prescriptions and actions proposed for forage and desired plant communities in the Conservation Unit.

Range Improvements: The proposed prescriptions and actions for managing range improvements in the Conservation Unit are contained in Table 3-19.

TABLE 3-18
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR FORAGE AND DESIRED PLANT COMMUNITIES

Management Prescription	Action	Affected Environment: Natural (BLUs)	Affected Environment: Human
Protect the range resource, enhance forage, increase cover, density, & frequency of desired forage species	Maintain or improve forage while protecting plant species important to wildlife	All	Range management practices partly affect forage condition
	Select key areas in each allotment for monitoring range condition & continue ongoing range studies		
	Institute changes in management practices if or when monitoring indicates desired range condition has declined		
Protect against damaging fire where fuels or problem species threaten	Allow removal of fuelwoods for home use from selected sites	CGH	
	Use fire as management tool		
	Encourage fire where undesirable shrub species such as rubber rabbitbrush reach high density		
Protect against soil loss from erosion	Encourage allottees to enter into cooperative agreements with SCS to develop erosion control plans on private lands within NCA boundaries		
	Enter into cooperative agreements with allottees on appropriate changes in management practices where erosion problems occur		
	Repair or replace existing erosion control structures when in disrepair		

TABLE 3-19
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR RANGE IMPROVEMENTS

Management Prescription	Action	Affected Environment: Natural (BLUs)	Affected Environment: Human
Protect range improvements and livestock	Inform visitors of policies about camping near developed waters, harassing livestock, or otherwise interfering w/ grazing use		Visitors are often attracted to developed water sites
	Inform visitors of potential impacts that can occur when they alter fences, gates, water tanks, & windmills	All	Recreators must understand importance of range improvements to effective management of unit
Ensure continued water supply for livestock	Continue agreements w/allottees to maintain existing waters	All	

NATURAL RESOURCES

This section includes discussions of air quality, water quality and availability, visual resources, and natural features.

Management Objectives for Natural Resources

NATURAL RESOURCES IN THE CONSERVATION UNIT WILL BE MANAGED FOR THEIR CONTINUED CONSERVATION IN BALANCE WITH THE MULTIPLE USE RESPONSIBILITY OF THE BLM, AND IN A WAY THAT GENERATES IN THE VISITING PUBLIC AN UNDERSTANDING OF THE RESOURCES' SIGNIFICANCE.

Current Situation

El Malpais was designated a National Conservation Area in large part because of its outstanding natural resources. In the Conservation Unit, these resources include Class II air quality, nationally significant geologic features (including evidence of a long volcanic history), a complex terrain attractive both to a wide variety of wildlife and to visitors, and prominent scenic values. NCA designation indicates a desire on the part of Congress to protect these resources.

Air Quality/Visual Resources

The NCA is currently designated a Class II area under the 1977 Clean Air Act. The airshed over the NCA meets all New Mexico and federal air quality standards.

The terrain and vegetation of the Conservation Unit are complex and offer a variety of opportunities for viewing scenic landscapes of great distances (several miles). Such viewsheds make any deterioration of visibility very apparent. Protection of this viewshed will require monitoring of conditions within the unit, along with assessment of the impacts of both internal and external influences on visibility.

Its outstanding visual features attract many visitors to the Conservation Unit each year. The complex terrain of the unit, reflected by the Biophysical Land Units (BLUs; ecotypes), is at least partially responsible for the wide variety of vegetation and wildlife found there, as well as the scenic values. The diversity of wildlife attracts visitors for a variety of recreational purposes, including hunting, bird watching, and other wildlife viewing. (A complete discussion of wildlife habitats may be found in the preceding section of this chapter.)

Water Quality and Availability

The quality of waters in the Conservation Unit is unknown, and surface waters are very rare. Most waters have been developed for cattle or wildlife use.

Different user groups wanting to access the limited amount of surface waters could encounter conflicts. Competition could develop between grazing interests, recreators, other visitors, and wildlife.

Water quality, a health and safety concern, could also be affected. Private land owners with waters are very concerned about protecting their investment, and in deterring any potential conflicts that may result from increased visitor use.

Natural Features

Natural features in the Conservation Unit include sensitive wildlife habitats, plants used by animals and humans, geologic features (including paleontologic resources), and minerals.

On the northwest side of the Conservation Unit, the interfingering of lava flows with sandstone and limestone ridges creates a diversity of habitat for wildlife. The ridges are the southeast end of the Zuni Mountains; they support a complex of Douglas fir and ponderosa pine woodland found here at elevations lower than would be expected. The lava flows between the ridges create depressions supporting groves of aspen with scrub and grass understories. Currant, oak, mountain mahogany, raspberries, grasses, wildflowers, and forbs offer a food supply for a variety of wildlife including deer, turkey, squirrels, and many species of birds. The subunit is called Cerritos de Jaspe after the Spanish name given to the jasper ridges that occur in the area.

In the western and southwestern portions of the Conservation Unit, the volcanic landscape dominates the scene. A series of volcanic cones extend from the Zuni Mountains, across the National Monument and into the Conservation Unit, then onto Ramah Navajo lands. This type of terrain makes up the Continental

Divide and Cerro Brillante subunits of the Conservation Unit.

The broad and low-lying shoulders of the shield volcano Cerro Rendija are contrasted with the steep-sided slopes of Cerro Brillante and the numerous other cinder cones that rise above a floor of 1.5- to 3-million-year-old lava flows. These older lava flows are covered with grass, low shrubs, and pinon-juniper trees, and have been fractured in places by faulting (Maxwell 1986). La Rendija (the crack), is an example of such faulting; it extends for miles in the southwestern portion of the Conservation Unit. These lava flows provide information about magma generation and mantle processes.

The rolling topography of the old lava flows creates numerous temporary lakes during rainy seasons. These lakes provide breeding grounds for invertebrates and amphibians, and attractive resting areas for a wide variety of birds including migratory waterfowl. Occasional glimpses of pronghorn antelope are available from County Road 42.

The eastern and southeastern portion of the Conservation Unit is characterized by mesas, canyons, buttes, and wide grassy valleys. This type of terrain includes the Brazo, the Spur, and the Breaks subunits of the Conservation Unit.

Sandstone forms a cliff face along the east side of the Conservation Unit at the base of Cebollita Mesa. The sides of Cebollita Mesa are covered by recent landslide deposits, and the mesa is capped by lava flows that are approximately 2.5 million years old (Crumpler 1982).

La Ventana Natural Arch and the sandstone bluffs that form a rampart along NM 117 provide a striking contrast to the volcanics. These outstanding visual features attract many visitors to the Conservation Unit each year. The bluffs also attract raptors, including the golden eagle. Although the bluffs and the arch lie within the Cebolla Wilderness Unit, they are within easy access for visitors to the Conservation Unit.

Fractures and fissures within the older lava flows in the unit, as well as certain sedimentary rocks, may contain animal and plant material that has accumulated over thousands of years. This paleontologic material may provide information about the area's past climatic conditions or other scientific data. Locations in the Conservation Unit that contain such material should be protected for scientific research purposes.

Within the Conservation Unit, visitors have ready, motorized access into sensitive habitats, unique geologic features, and cultural features of national significance. This easy access provides unique opportunities to introduce visitors to a variety of natural resources, and to develop in them an increased understanding and appreciation of these resources.

Sensitive habitat is determined by the survival needs of each species of plant or animal, which vary considerably. Ready access by visitors may result in damage to such unique and sensitive habitats in the Conservation Unit. The very erodible soils found in BLUs B and I make erosion control an important part of managing the unit. Existing patterns of erosion threaten sensitive habitats in those BLUs. (A more complete discussion of sensitive habitats in the Conservation Unit is found in the Wildlife Habitat section of this chapter.)

Native Americans have used the Conservation Unit since prehistoric times; these groups continue to use the unit to collect vegetative materials for traditional religious and cultural purposes. The diverse vegetation that is part of the many habitats found in the Conservation Unit provides a resource that should be maintained for continued use by Native Americans. (Further discussion of such use can be found in the "Native American Issues" section of this chapter.)

The pinon and juniper trees found in BLUs C, D, G, H, and J are considered important fuelwoods that are highly regarded by area residents for home heat. In addition to fuelwood, pinons supply a nut crop valued by both humans and wildlife. Removal of fuelwoods for home use is allowed by the El Malpais legislation, but such removal must also reflect wildlife habitat management goals. Commercial woodcutting and timber production were retired with NCA designation.

Mining was retired with NCA designation, except for private mineral rights located in the southeast corner of the Conservation Unit that may have existing mineral leases associated with them. Some mineral rights have been acquired by the BLM, and more are expected to be acquired (refer to Appendix B for a discussion of such acquisitions). Acquisition of the last private inholdings will exclude any form of extractive mineral development from the Conservation Unit.

Assumptions

* Fuelwoods for home use can be removed from selected areas in the Conservation Unit to enhance wildlife habitat and reduce the threat of fire.

* A detailed fire management plan based on the proposed prescriptions and actions for the Conservation Unit will be included in the Final GMP.

Policy

* Federal and state air quality control regulations set the standards to which the BLM must adhere.

* Federal regulations set the standards BLM must follow regarding water quality. The El Malpais legislation allows enough water rights to operate the NCA, although these rights must be applied for from the State Engineer.

* The El Malpais legislation directs protection of the variety of scenic, cultural, and geologic features that are the natural resources of the NCA.

* Any surface-disturbing proposals in the Conservation Unit will include analysis of potential impacts to the viewshed and proposed mitigation where possible.

* The BLM will monitor selected air quality parameters under a cooperative agreement with the National Park Service.

Management Prescriptions and Actions for Natural Resources

Water Quality and Availability: Table 3-20 contains the proposed prescriptions and actions for managing water quality and availability in the Conservation Unit.

Natural Features: Table 3-21 lists the management prescriptions and actions proposed for natural features in the Conservation Unit.

Visual Resources: Table 3-22 contains the proposed prescriptions and actions for managing resources in the Conservation Unit.

TABLE 3-20
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR WATER QUALITY AND AVAILABILITY

Management Prescription	Action	Affected Environment: Natural (BLUs)	Affected Environment: Human
Protect public health	Inform visitors of potential dangers from using or drinking any surface waters or waters from any stock tanks	All	Recreators will find water in short supply
	Develop safe water supply for visitor use at selected sites in NCA, & monitor water quality at regular intervals	BI	Visitors will expect safe water supply to be available
Protect private property & water	Sign to inform visitors of owner status Inform visitors about policies on camping near stock tanks or springs	All	Recreators will find water in short supply
Protect water quality	Inform visitors of potential impacts of camping too close to waters		Recreators are attracted to sites w/surface water
Acquire adequate legal water rights for unit	Apply for water rights w/the NM State Engineer		

TABLE 3-21
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR NATURAL FEATURES

Management Prescription	Action	Affected Environment Natural (BLUs)	Affected Environment Human
Provide resource protection, enhance increased understanding of unique habitat, geologic & paleontologic features of NCA	Inform public about variety of wildlife habitats found in complex terrain & geology of Cerritos de Jaspe subunit	CFGHI	Unique forest vegetation attracts campers & other recreators
	Inform public about unusual geologic & cultural aspects of La Rendija (Maxwell's Fault) and the ancient lava flows under grasslands of unit	A	Continental Divide National Scenic Trail may pass very near this feature
	Inform public about unusual geologic & cultural aspects of Cerro Rendija, large shield volcano	CDG	Close to NPS attractions
	Inform public about geology & cultural aspects of sandstone cliffs common to Brazo subunit and La Ventana Natural Arch	I	Arch & sandstone cliffs attract many day-use recreators
	Enter into agreements w/appropriate institutions to conduct research in area of La Rendija (Maxwell's Fault) & other areas of geologic & paleontologic interest	All	
Protect pinon pine	Deter cutting of selected mature live trees	CH	Cutting of fuelwoods for home use should only provide habitat protection
	Control pinon nut collecting to ensure adequate seed crop		Collecting by recreators, Native Americans expected to increase

TABLE 3-22
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR VISUAL RESOURCES

Management Prescription	Action	Affected Environment Natural (BLUs)	Affected Environment Human
Protect scenic quality along NM 117 & NM 53	Acquire scenic easements for each corridor	All	Visitors expect predominantly natural viewshed
Ensure all developments blend in with natural environment according to Class II standards	Assess all proposed projects using visual contrast rating process	All	
	Consider visual absorption capability of BLU(s) being affected by any development proposals		

CULTURAL RESOURCES

Management Objectives for Cultural Resources

CULTURAL RESOURCES WILL BE MANAGED WITH AN EMPHASIS ON FUTURE SCIENTIFIC USE AND, TO LESSER EXTENT, FUTURE AND CURRENT PUBLIC USE. THESE CULTURAL RESOURCES WILL BE MANAGED TO CONSERVE THEM IN A STABLE CONDITION FOR FUTURE SCIENTIFIC USE FOR AS LONG AS POSSIBLE.

Current Situation

Little archeological information is available for the Conservation Unit. The percentage of archeological survey in each of the major subunits of the Conservation Unit is shown in Table 3-23. In addition to the Class III inventory, some reconnaissance information is available for the Breaks subunit, and informal reconnaissance gives some knowledge of the Cerritos de Jaspe subunit. Almost nothing is known of the Neck subunit.

TABLE 3-23
PERCENTAGE OF CLASS III ARCHEOLOGICAL SURVEY IN THE CONSERVATION UNIT

Brazo	2.1
Breaks	1.9
Cerritos de Jaspe	0
Cerro Brillante	1.0
Continental Divide	0.8
Neck	0
Spur	1.9

The Spur, the Breaks, and perhaps the Cerritos de Jaspe subunits include relatively high site densities, while low to moderate densities prevail elsewhere in the Conservation Unit. Known sites range from Early Archaic to Historic in age, but those of the Pueblo II and Early Pueblo III periods are most common.

One large Late Pueblo III fortified site, the Pinole Site, is situated partially on public land and partially on private land within the Conservation Unit. Portions of the Mid- to Late Pueblo III Cebolla Canyon Complex, including the Arroyo Site and the Oak Tree Site, are within the Conservation Unit. Several interesting homesteads are also included in this unit, particularly in the Brazo subunit.

Cultural resources management in the Conservation Unit has focused on the Cebolla Canyon Complex. The Oak Tree Site was stabilized in 1978 and potholes at the nearby Skull Site were backfilled. In 1982 a field school from Simon Fraser University, working under a cooperative agreement with the BLM, salvaged a portion of Arroyo Ruin, an Anasazi roomblock that was being washed away by severe erosion. Subsequently two erosion control structures have been installed above this site in an effort to retard further destruction. Low-level aerial photography that covers the core of this prehistoric community has also been taken, and a photogrammetric topographic base map has been prepared.

The 1989 archeological survey provides systematic information about the condition of archeological resources in several subunits of the Conservation Unit. These data suggest that vandalism and erosion are the most serious threats to both public use and potential scientific use of cultural resources in the Spur and Breaks subunits, where most resources occur.

Vandalism and Surface Collection: The 1989 archeological survey of the NCA suggests that 15 percent of all vulnerable sites in the Conservation Unit show signs of vandalism or illegal surface collection. Vandalism includes pothunting, theft of artifacts or building materials, and deliberate defacement or destruction of cultural properties.

These activities seem to occur at relatively wide intervals, but their effects are irreversible and they affect cultural resources selectively. The largest and most important resources are often the most seriously damaged by these activities.

Collection of surface artifacts is also included in this element because many of the same management prescriptions apply. Collection of surface artifacts can seriously reduce the potential for scientific investigation.

Natural Deterioration: An estimated 83 percent of all archeological sites in the Conservation Unit suffer to some degree from soil erosion. For 15 percent of these the damage is judged to be serious. Erosion primarily threatens scientific potential. Actual impacts range from sheet erosion, which gradually exposes artifacts and destroys their site in a very short time, to massive gullying, which can completely obliterate an archeological site in a very short time. The underlying causes of this erosion are not well understood. Other sources of natural deterioration affect historic homesteads, which are constructed of flammable materials and materials subject to natural decay.

BLM Authorized Actions: Actions taken and authorized by the BLM can have important effects on cultural resources. The BLM must carefully consider these effects, particularly because of the special mandate to protect archeological and historical values in El Malpais. Therefore, the management prescriptions for this element reflect a more careful, conservative approach than usually applies on multiple use lands. Although restrictions apply to some forms of research, investigations that do not involve excavation or collection and those that focus upon threatened properties should be actively encouraged.

Public Information and Education: An important aim of the public education prescriptions and actions in this document is to develop a positive land ethic, particularly with regard to cultural resources. Actions proposed for this element range from interpretation of specific properties to more general actions such as preparation of brochures or exhibits.

This theme is further elaborated upon and reinforced in Chapter 9, a summary of the interpretation and education prescriptions and actions for the NCA. Of particular interest is the concept of a field learning center to fill not only interpretation and education needs, but also to provide a forum for scientific research.

Assumptions

* The principal threats to cultural resources within the Conservation Unit are vandalism, surface collection, erosion and natural deterioration, and federally authorized actions.

* Generally, cultural resources within the NCA will receive higher levels of protection than those outside the NCA.

Policy

* One principal objective of the El Malpais legislation is to protect archeological resources, within special attention to enforcement of the Archeological Resources Protection Act (ARPA) and the National Historic Preservation Act.

* The El Malpais legislation also mandates a continuing program of public education and interpretation about the resources of the NCA, including cultural resources.

* Cultural resources within the NCA will be managed more conservatively than those outside the NCA.

* Most sites will be managed to preserve their potential for scientific investigation.

* The Pinole Site, the Cebolla Canyon complex, and several historic homestead sites will be managed to preserve their potential for public interpretation.

* The prehistoric reservoir located near the proposed Ranger Station will be developed for public interpretation.

Management Prescriptions and Actions for Cultural Resources

Vandalism and Surface Collection: Table 3-24 lists the management prescriptions and actions proposed to protect cultural resources in the Conservation Unit from vandalism and surface collection.

TABLE 3-24
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR VANDALISM AND SURFACE COLLECTION

		Affected Environment	
Management Prescription	Action	Natural (BLUs)	Human
Aggressively enforce ARPA by enhancing probability of catching & successfully prosecuting violators	Establish & publicize rewards for information leading to arrest & conviction of ARPA violators	All	Increasingly, ARPA violators are professional criminals who loot sites for profit

TABLE 3-24 -- CONCLUDED

Management Prescription	Action	Affected Environment Natural (BLUs)	 Human
	Ensure ARPA training for law enforcement & other key field personnel	All	ARPA enforcement requires specialized training
	Post antiquities signs in areas of active vandalism (e.g., Cebolla Canyon Complex)	ABI	Place signs so as not to attract vandals to undisturbed sites
Discourage vandalism & illegal surface collection	Consolidate ownership of critical properties (e.g., Pinole Site, Cebolla Canyon Complex) to clarify land ownership	ABI	Looters claim their activities are on private land
	Restrict vehicle access to areas w/sensitive sites & high site densities (e.g., Cebolla Canyon Complex, Spur)	ABI	This will reduce illegal collection & force looters to leave vehicles exposed
	Increase BLM visibility in unit, especially during increased visitor use & in sensitive areas (e.g., NM 117 corridor)	ABI	General correlation assumed between visitor use & casual excavation/surface collection
Identify sites & areas vulnerable to & affected by vandalism & surface collection	Increase level of Class II inventory to 5% of unit (5,759 acres of new survey)	All	Patterns of vandals' activities should be understood
	Complete Class III inventory of Cebolla Canyon Complex (160 acres + additional acreage in Cebolla Wilderness Unit), Spur area (360 acres), & other key areas identified through Class II inventory	ABI	Baseline information needed to support ARPA prosecution
	Through aerial photointerpretation, review of existing records, & reconnaissance, record & photodocument all homesteads & rock art sites in unit	ABI	Baseline information needed to support ARPA prosecution
Closely monitor sites & areas most vulnerable to vandalism & surface collection, to recognize & stop problems early	Establish annual photomonitoring for Oak Tree Site & other key vulnerable sites	ABI	Baseline information needed to support ARPA prosecution
	Establish & implement program to systematically revisit recorded sites to gather information about changes in condition	ABI	Patterns of vandals' activities should be understood
	Acquire easements into lower Cebolla Canyon and Cerritos de Jaspe to ensure legal access for monitoring & law enforcement	ABCI	Federal access into these important areas could be blocked at any time
	Prepare damage assessments for incidents of recent vandalism	ABC	Need to quantify amount of damage done by vandals
	Initiate long-term study using detailed surface documentation to record effects of surface collection (perhaps w/sites near Ranger Station, Arch, Dittert Site)	ABI	Nature, degree, rate of deterioration caused by casual artifact collection by visitors not well known

Natural Deterioration: Table 3-25 outlines the proposed prescriptions and actions to mitigate natural deterioration of cultural resources in the Conservation Unit.

BLM Authorized Actions: Table 3-26 contains the prescriptions and actions proposed to prevent damage to cultural resources from BLM authorized activities in the Conservation Unit.

Public Information: Management prescriptions and actions found in Table 3-27 are directed at educating and informing the public about the cultural resources of the Conservation Unit.

TABLE 3-25
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR NATURAL DETERIORATION

Management Prescription	Action	Affected Environment: Natural (BLUs)	Affected Environment: Human
Identify sites & areas vulnerable to & affected by natural deterioration	Increase level of Class II inventory to 5% of unit (5,759 acres of new survey), emphasizing information about site condition	All	Important scientific & perhaps interpretive values being lost without BLM knowledge
	Through aerial photointerpretation, review of existing records, oral history, & reconnaissance, record & photodocument all homesteads & rock art sites within unit	ABCI	Potential interpretive properties should be identified & factors affecting their condition evaluated
Closely monitor sites & areas most vulnerable to & affected by natural deterioration to recognize & stop/mitigate problems early	Establish annual photomonitoring for Oak Tree Site, Pinole Site, Arroyo Ruin, Site 407, well-preserved homesteads, & other vulnerable sites w/potential for public interpretation or high scientific value	ABI	Condition of important scientific & interpretive sites should be closely monitored
	Establish & implement program to systematically revisit recorded sites threatened by natural deterioration to update information about changes in condition	ABCI	Scientifically important resources being lost through natural erosion
Preserve important scientific values & sites w/public interpretation potential through physical protection measures when values may be lost	Maintain existing stabilization and erosion control projects at Arroyo Ruin & Oak Tree Site	AB	Scientific & interpretive values could be lost through site neglect
	Develop erosion control plan for Spur, Breaks, & Brazo subunits, emphasizing preservation of cultural resources	ABI	Important scientific & interpretive values being lost
	Undertake new stabilization, backfilling, & repairs at Pinole Site, Citadel Complex, & historic homesteads	ABCI	Important interpretive values lost if measures not taken
	Through training or detail assignments, develop staff expertise in repair & preservation of historic homesteads & related features	ABCI	Specialized knowledge & skills required
	Establish & stake high-priority fire suppression zones to protect high-value homesteads that include flammable elements	ABCI	Properties w/public interpretation potential could be lost

TABLE 3-26
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR BLM-AUTHORIZED ACTIONS

Management Prescription	Action	Affected Environment: Natural (BLUs)	Affected Environment: Human
Preserve long-term potential of sites for scientific use	Restrict research involving collection or excavation at non-threatened sites (refer to Chapter 13)	ABI	Research can destroy or diminish scientific potential
	Avoid cultural resources rather than mitigating development- & use-related impacts	All	
	Inventory at least 1/4-mile radius around proposed visitor-use developments, considering potential secondary impacts	ABI	Cumulative impacts of casual collection by visitors can severely damage cultural resources
	Expand base of archeological properties in unit by adding 13,000-acre Tank Canyon area		
Reduce need for research involving collection or excavation by encouraging use of existing collections	Write up excavations from Arroyo Site & arrange for permanent curation of its artifacts	ABI	
	Locate existing collections from previous research & compile copies of project records	ABI	
Emphasize importance of key cultural resources	Nominate Cebolla Canyon Complex, Pinole Site, & selected homestead sites to National Register of Historic Places	ABI	National Register listing will enhance public perceptions of properties' importance

TABLE 3-27
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR PUBLIC INFORMATION AND EDUCATION

Management Prescription	Action	Affected Environment: Natural (BLUs)	Affected Environment: Human
Maintain continuing program of interpretation & public education about cultural resources in NCA	Present cultural resources in exhibits in Multiagency Center & BLM Ranger Station		
	Incorporate cultural resources into environmental education programs given at schools		
	Prepare site bulletin (brochure) about cultural resources of NCA		
	Identify cultural resources with public interpretation potential (e.g., Cebolla Canyon Complex, suitable homesteads) & manage them to maintain potential	ABI	
	Develop onsite interpretation at Ranger Station reservoir	ABI	
	Modify unit boundary to include large pueblo near Ranger Station & develop onsite interpretation for property		

NATIVE AMERICAN ISSUES

Management Objectives for Native American Issues

THE CONSERVATION UNIT WILL BE MANAGED TO ENSURE ACCESS FOR TRADITIONAL NATIVE AMERICAN CULTURAL AND RELIGIOUS PRACTICES, ENSURE PRIVACY AND RESPECT FOR THOSE PRACTICES, AND FOSTER AN ATMOSPHERE OF COMMUNICATION AND COOPERATION WITH LOCAL NATIVE AMERICAN GROUPS.

Current Situation

Both the Acoma and the Ramah Navajo Indians have expressed strong interest in the Conservation Unit. Past Navajo uses of the unit include plant gathering, hunting, and probably livestock herding. Numerous sweatlodges of presumed Navajo origin occur throughout the unit. Portions of the lava that have mythological importance are found in the Conservation Unit, and it is very likely that prayer locations and other places of religious importance to the Navajos occur here as well.

The unit is believed to contain numerous places important in the Acoma religion, including lava flows, shrines, high points, water sources, caves, and pilgrimage routes. The many archeological sites found in the Conservation Unit are also of importance and concern to the Acomas. Although specific information is difficult to obtain, it is believed that the Acomas also collect plant materials in parts of the unit. The Acomas have a grazing allotment in the Breaks subunit of the Conservation Unit that includes intermingled Acoma Tribal Trust and NCA lands.

In accordance with the wishes of Native American groups, the BLM does not actively manage any sites or areas for traditional Native American uses. Instead, the BLM seeks to keep these groups informed about major activities proposed in El Malpais, giving them time to react if traditional uses are likely to be affected.

Native American Concerns: A diversity of deeply rooted cultural traditions is one of the special characteristics New Mexico offers. In addition to enriching the lives of its citizens, this cultural diversity is one of the cornerstones of New Mexico's tourist industry. In the El Malpais legislation, Congress made it very clear that the NCA, including the Conservation Unit, is to be managed in ways that accommodate the needs of traditional American Indian peoples and that allow the continuance of traditional cultural practices.

Assumptions

* Historical Native American uses of El Malpais have been gradually displaced over the past four centuries.

* Important Native American uses of El Malpais do continue, particularly those involving traditional cultural and religious practices.

* Religious and other traditional cultural practices often require privacy and extreme secrecy. Even speaking of some places can be a form of desecration.

* Continuous communication and interaction with Native American groups are necessary to maintain the personal relationships that provide a basis for trust and mutual respect.

Policy

* The El Malpais legislation requires close consultation with Native American groups during the planning process.

* The El Malpais legislation requires that access for continued traditional cultural purposes be allowed, and permits the temporary closure of special areas to ensure privacy.

* The American Religious Freedom Act requires federal agencies to consider the effects of their actions upon the practice of traditional Native American religions.

Management Prescriptions and Actions for Native American Issues

Native American Concerns: The following table lists the management prescriptions and actions proposed for Native American concerns in the Conservation Unit.

TABLE 3-28
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR NATIVE AMERICAN CONCERNS

		Affected Environment	
Management Prescription	Action	Natural (BLUs)	Human
Protect continued use of the unit by Native Americans	Avoid placing public use facilities in sensitive areas	All	
	Use trail placement & other design factors to direct visitor use away from identified sites of religious or traditional cultural activities	All	
Encourage respect for Native American viewpoints	Protect Native American interests over long term by continued consultation & liaison w/interested local Indian tribes		
	Develop interpretive materials in cooperation w/interested local Indian tribes		
	Conduct cultural sensitivity training for law enforcement & other key field personnel		
Reaffirm equal employment opportunity for Native Americans in NCA staffing			
	Target law enforcement position for Native American hire		
	Target interpretive specialist position for Native American hire		

Section 4
Conservation Unit Environmental Assessment

INTRODUCTION

This section represents an analysis of the effects to the environment that would result from implementing either the Preferred Alternative or the Low Change Alternative. Chapter 2 contains a description of the Low Change Alternative, and Section 3 of Chapter 3 describes the actions proposed for the Conservation Unit under the Preferred Alternative. A complete description of the affected environment in the National Conservation Area is in Chapter 2. Chapter 2 and Appendix D provide a detailed summary of consultation and public input.

ENVIRONMENTAL CONSEQUENCES OF THE PREFERRED ALTERNATIVE

In general, management prescriptions and actions developed under the Preferred Alternative would provide increased visitor access into dispersed portions of the Conservation Unit and improve visitor comfort and safety. The BLM would implement interpretation and education opportunities to increase visitor understanding and enjoyment of the natural and cultural resources present in the unit.

Wildlife habitat would be conserved, and populations and diversity of wildlife would be optimized. Range resources would be managed to improve forage condition. Range improvements would be developed and maintained.

Cultural resources actions would be implemented to provide for future scientific use and future and present public use. Cultural resources would be protected from vandalism and surface collection, natural deterioration, and conflicts with other resource uses.

Native Americans would be ensured access to the Conservation Unit for traditional Native American cultural and religious practices. An atmosphere of communication and cooperation with local American Indian groups would be fostered.

The following analysis of impacts from implementing the Preferred Alternative focuses on recreational use, wildlife habitat, range management, cultural resources, and Native American uses. Based on scoping and analysis, no impacts were identified to water or air quality, so these topics are not evaluated further.

Impacts to Recreational Use

Recreational use of the 141,800-acre Conservation Unit is expected to increase. Visitor use currently approaches 40,000 people annually, with projected use to exceed 200,000 visitors a year by the year 2000. Most of the visitor use is expected to occur at proposed facilities. Prescriptions and actions for recreation use focus on facility development, interpretive and educational opportunities, visitor management, and resource protection.

Some facilities are proposed to allow management of current and increasing visitor use at existing sites such as La Ventana Natural Arch, the Dittert Site, and the South Big Narrows. Other facilities are proposed to expand visitor use in the Conservation Unit and to provide a wide range of recreational opportunities. These facilities include orientation kiosks; bike, foot, and horse trails; a ranger station; and further developments at La Ventana Natural Arch, the South Big Narrows, the Dittert Site, and along the transportation corridors of NM 117, NM 53, and CR 42.

Facilities would be designed to protect natural resource values, and to blend into the environment to reduce potential impacts to visual resources. The level of visual intrusion would depend on the presence or absence of vegetative screening, and the type of terrain present at the site. Facilities would also be sited to avoid sensitive wildlife or plant habitat and cultural resources; this requirement may limit site availability and timing of construction activities.

Improved interpretation and education opportunities may result in increased visitor understanding and enjoyment of the natural and cultural resources present in the Conservation Unit. Increased visitor understanding of resource values may result in less damage to those resources as the result of visitor use.

The recreational experience of visitors could be enhanced by implementing the proposed wildlife habitat, range management, and natural resource prescriptions and actions. Wildlife prescriptions may result in increased wildlife populations, and thus in more opportunities for wildlife viewing, photography, and hunting. Recreational use of some areas may be limited during certain seasons to protect sensitive wildlife species or their habitat. Range management prescriptions may result in improved range condition on some allotments, which would improve visual resources. Implementation of natural resource objectives would enhance recreation by developing safe drinking water, maintaining air quality, and providing interpretive programs near the unique geologic features of Maxwell's fault, Cerro Rendija, La Ventana Natural Arch, and other areas of geologic interest.

If adopted, the Preferred Alternative would amend the BLM's Rio Puerco Resource Management Plan (RMP; 1986) for location of the Continental Divide Trail. The proposal for relocating the trail is based on a reassessment of information regarding recreational needs, land status, highly erodible soils, and cultural site density along the original east side route. The western trail route (refer to Map 6-6 in Chapter 6) is consistent with the National Park Service's trail segment proposal, and has been chosen as the Preferred Alternative because it avoids resource conflicts. The proposed western route follows approximately 3 miles of the actual Continental Divide. The trail travels through highly scenic areas of varying ecological zones.

In conclusion, the Preferred Alternative would impact recreational use by increasing the total amount of such use of the Conservation Unit, and by increasing the unit's variety of recreational opportunities. Recreational values would be enhanced by improving access for visitors and improving visitor appreciation of the unit. Scenic values would be maintained by utilizing mitigating measures in the design and construction of facilities.

Impacts to Wildlife Habitat

Management prescriptions and actions for wildlife habitat emphasize conserving the habitats found in the unit and optimizing the populations and diversity of wildlife found there. Actions designed to protect wildlife habitat include deterring construction during critical periods of the life cycle of high interest species, reseeding disturbed sites with high-value forage or cover species, designing projects to provide maximum wildlife benefits, implementing interpretive programs to provide the public information about sensitive wildlife species and their habitat, and surveying to determine the presence of threatened and endangered species prior to construction.

In conclusion, implementing many of the management prescriptions and actions under the Preferred Alternative would enhance wildlife habitat by improving browse and forage condition, reducing soil erosion and habitat loss, maintaining and developing additional water sources, and maintaining habitat diversity. Wildlife populations would be enhanced by providing additional measures for species protection, deterring destruction of special use sites, and managing forage and cover to support optimum population sizes. These enhancements to habitat, in conjunction with cooperation with the New Mexico Department of Game and Fish, would probably increase animal populations (including antelope) and possibly lead to reestablishment of desert bighorn sheep. Overall, wildlife values in the Conservation Unit would be enhanced.

Impacts to Range Management

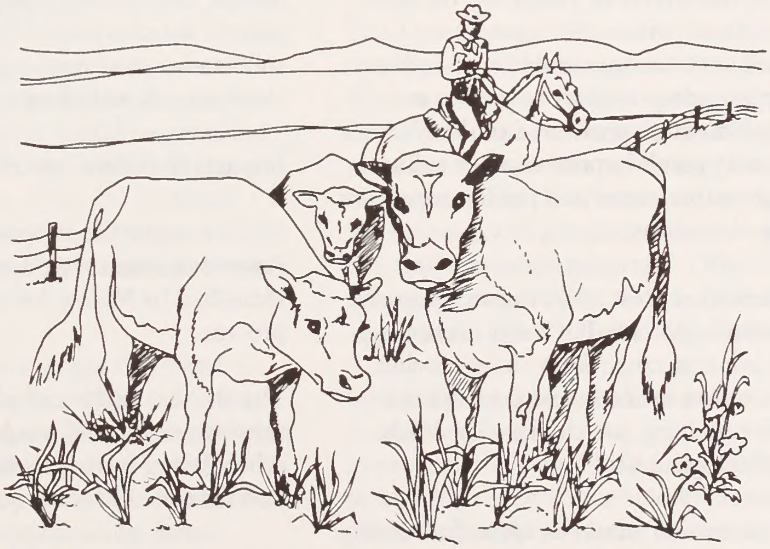
Implementing the Preferred Alternative may improve forage condition on three allotments. This improvement would result from changes in livestock management practices, the development of range improvements, and the prevention of forage loss through erosion control.

Range improvements may be proposed on any of the nine allotments located in the Conservation Unit. Range improvements such as fences, livestock waters, prescribed fires, and seedings would be designed to improve livestock distribution and forage condition. Range improvements would be proposed first on the three "Improve" category allotments.

Some actions may require temporary removal of livestock from an area to meet resource management goals. For example, livestock may be removed from a seeding area for a period of 2 to 5 years to allow seedlings to become established. In other areas, livestock may be permanently removed from small areas such as campgrounds to reduce conflicts with recreators.

Removal of livestock in small areas is not expected to reduce available Animal Unit Months (AUMs) on any allotment. Increases or decreases in AUMs would be based on vegetative condition and trend monitoring transects, and would be coordinated with the allottee.

Information and education programs would provide the public with knowledge about livestock management and the importance of maintaining range improvements. Information and education of visitors may reduce interference with grazing use.



In conclusion, management prescriptions and actions developed for range management would focus more attention on the three allotments previously identified in the Rio Puerco RMP as needing improvement. This attention would result in an improvement in the ecological condition of these three allotments. Overall, the impact of the Preferred Alternative would be a maintenance or improvement in the ecological condition of the range.

At some of the proposed recreational facilities, however, livestock grazing would be excluded. Because the acreage associated with these facilities is less than .2 percent of the Conservation Unit, no impact would occur to available AUMs.

Impacts to Cultural Resources

Management prescriptions and actions for cultural resources are designed to emphasize future scientific use and future and present public use. The principal threats to cultural resources in the Conservation Unit are vandalism and surface collection, natural deterioration, and conflicts with other resource uses.

Implementing the cultural resource actions could curb vandalism and surface collection of artifacts by aggressive enforcement of the Archeological Resources Protection Act through BLM patrols, increasing agency visibility, limiting access into sensitive areas, and channeling visitors away from vulnerable cultural resource sites where facilities are proposed. Inventory and monitoring efforts would be increased on at least four sites to identify sensitive areas and monitor the effects of visitor use on them.

A complex of sites at two areas would be placed in public ownership to reduce artifact collection on private land. Implementation of some of the Native American issues may result in protection of cultural resources through enforcement and public respect for Native American viewpoints.

Within the Conservation Unit, soil erosion seriously threatens the scientific potential of many archeological sites. Actual impacts range from sheet erosion, which gradually exposes artifacts and destroys their content, to massive gullying, which can completely obliterate an archeological site.

Sites vulnerable to erosion would be identified during a 5,759-acre inventory. Monitoring at several known and many more potential sites would help the BLM recognize and mitigate erosion problems. Existing soil stabilization projects would be maintained at two sites. Erosion control plans would be developed for three areas, and new erosion control measures would be undertaken at two site areas and selected historic homesteads. Actions designed to enhance wildlife habitat, range management, or natural resources may reduce sheet or gully erosion and result in the protection of some cultural resources.

Surface-disturbing activities proposed by the BLM or other agencies, individuals, or institutions may destroy or diminish the scientific potential of cultural resources. To reduce those impacts, the BLM plans to inventory at least a 1/4-mile radius around proposed visitor use facilities to consider secondary impacts related to casual surface collection. Surface collection may increase where facilities are proposed at La Ventana Natural Arch, the South Big Narrows, the Dittert Site, and along the NM 117 corridor.

Other actions proposed under the Preferred Alternative that could preserve cultural resources for scientific use are to avoid sites rather than excavate when developing facilities, and to use existing collections for research rather than excavate. Two site areas and selected homesteads would be nominated to the National Register of Historic Places to enhance public perception of site importance. Public education and information actions may result in increased public awareness and respect for cultural resources, leading to long-term secondary protection.

In conclusion, implementation of the Preferred Alternative for cultural resources could inhibit vandalism, curb surface collection of artifacts, retard the natural deterioration of cultural resources reducing soil erosion, and minimize the impact of BLM-authorized actions including scientific study.

Impacts to Native American Uses

Implementing the proposed actions for Native American issues would address many of the concerns identified by Native Americans during the scoping process.

The BLM would avoid placing public use facilities in sensitive areas, and would use trail placement and other design factors to direct use away from identified sites of cultural or religious significance.

Improved forage condition may ensure the continued presence of vegetative materials used by Native

Americans for traditional cultural and religious purposes. Increased visitor use and development along NM 117 may create conflicts with current Native American uses, but protection of cultural resources from vandalism may protect such uses. In some cases, provisions for scientific study and public interpretation may conflict with Native American values.

In conclusion, implementation of the Preferred Alternative would ensure access for traditional Native American cultural practices, ensure privacy and respect for those practices, and foster an atmosphere of communication and cooperation with local American Indian groups. However, increased visitor use and development, scientific study, and public interpretation in the Conservation Unit may conflict with Native American uses and values.

ENVIRONMENTAL CONSEQUENCES OF THE LOW CHANGE ALTERNATIVE

The Low Change Alternative is an alternative to the proposed plan (Preferred Alternative). The Low Change Alternative contains only the minimum changes to the existing environment that would be necessary to meet the intent of the El Malpais legislation. In most cases, the Low Change Alternative is a reflection of existing conditions in the Conservation Unit, and describes how the BLM is managing the unit until the Final GMP is approved. As does the Preferred Alternative, the Low Change Alternative presents management prescriptions and actions for each of the planning issues.

Impacts to Recreational Use

Implementing the Low Change Alternative would allow maintenance of existing recreational opportunities. Development of facilities would be provided only when resource damage is highly probable as a result of increased visitor use. Only the facilities described in the legislation (the BLM Ranger Station) and those needed to protect resources would be constructed.

Areas threatened by public use would be closed to visitor access to protect resources. Public information and education would be provided off-site without coordinating with research and teaching institutes. However, the recreational opportunity for visitors engaged in wildlife viewing, appreciating visual resources, and experiencing other resource values in the Conservation Unit would be maintained. Recreational objectives described in the Rio Puerco RMP for this area could be carried out. The Continental Divide Trail would be routed down the east side of the NCA rather than the west side route described in the Preferred Alternative.

In conclusion, recreational use of the Conservation Unit would be concentrated in and restricted to areas along NM 117, NM 53, and CR 42. Visitor comfort and safety would not be accommodated with additional facilities or a public outreach program.

Impacts to Wildlife Habitat

Implementing the Low Change Alternative would allow wildlife habitat improvement facilities to be developed, if needed, to maintain existing habitat conditions. Human presence in dispersed portions of the Conservation Unit would be reduced, resulting in less human-wildlife interaction. With maintenance of current grazing systems and range improvements, conflicts between recreators, grazing users, and wildlife may increase in critical areas near water development so other impacts to wildlife would be similar to those described above under the Preferred Alternative.

In conclusion, implementation of the Low Change Alternative could maintain existing wildlife habitat and current population levels, however, increased conflicts could occur between recreators, wildlife, and grazing users in critical areas near water developments.

Impacts to Range Management

The Low Change Alternative would continue to emphasize range management on three allotments. Waters and other range improvements would be developed on the remaining six allotments only if resource damage was occurring. Conflicts between range users and other resource users such as recreators could increase without a public interpretation and education program. Other impacts to range management would be similar to those described above under the Preferred Alternative.

In conclusion, forage condition for livestock would be maintained in its existing condition. Range improvements would be maintained, and a minimum of new improvements would be developed to ensure a continuing supply of water for livestock. Conflicts between range users and other resource users could increase because no public interpretation and education program would be developed.

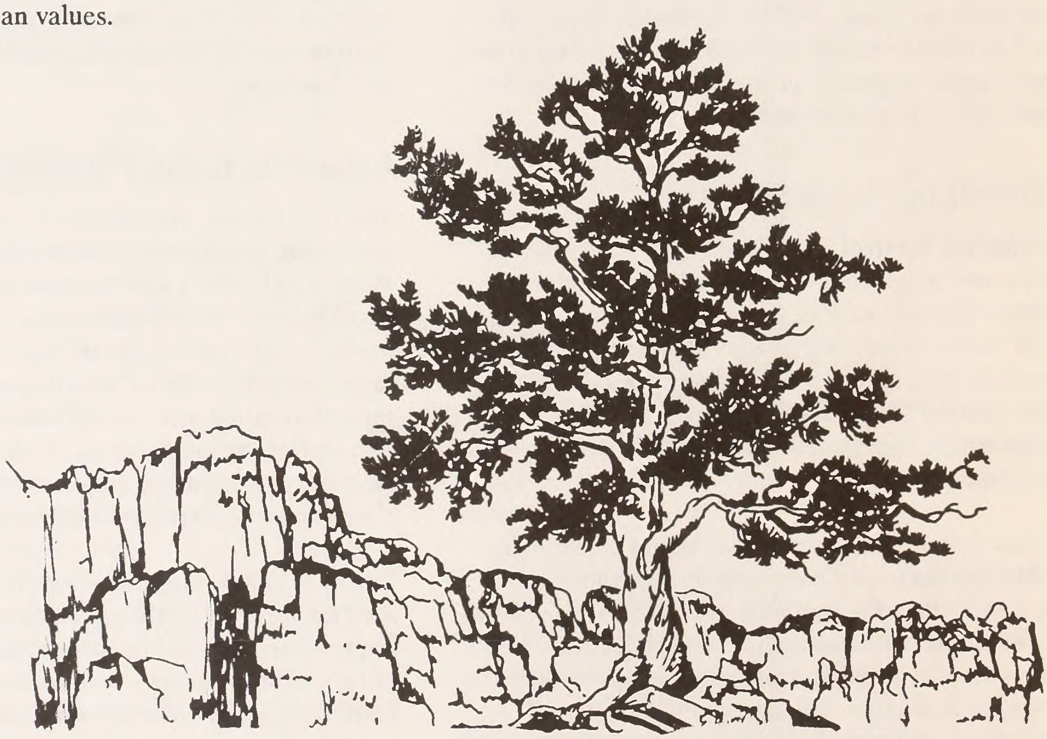
Impacts to Cultural Resources

For cultural resources, the Low Change Alternative minimizes changes in the existing condition of the Conservation Unit's cultural resources. Therefore, the Low Change Alternative consists of the strongest, most aggressive management actions to ensure little change in the cultural resources. Under this alternative, the BLM would implement stronger prescriptions for the long-term protection and interpretation of archeological and historic properties in the Conservation Unit.

In conclusion, the Low Change Alternative would result in stronger actions to protect cultural resources, resulting in increased patrol and surveillance, higher levels of inventory on more acres, and more erosion control projects than described for the Preferred Alternative.

Impacts to Native American Uses

Impacts to Native American uses would be generally the same under the Low Change Alternative as those described above under the Preferred Alternative. The lower level of interpretive and development activity under this alternative may create less conflict with Native American values.



CHAPTER 4

Cebolla Wilderness Unit Management Plan

Chapter 4
Cebolla Wilderness Unit Management Plan

Section 1
Introduction

PURPOSE OF THE PLAN

As one management unit of the NCA, the Cebolla Wilderness will be managed in accord with the overall philosophy and goals of the NCA (refer to Chapter 1). In addition, the El Malpais legislation requires the BLM to prepare a separate management plan for the Cebolla Wilderness. The management plan contained in this chapter provides guidance for management of the Cebolla Wilderness. Specific goals for the Cebolla Wilderness are described. It also establishes the objectives, policies, and management prescriptions and actions which will guide administration of the Cebolla Wilderness. These have been designed to meet the established wilderness goals.

Resource management objectives for resource programs operating in the Cebolla Wilderness prior to wilderness designation have been updated as part of this plan. This plan provides general management direction covering the 10 year period from 1990 to 2000. Revision processes are the same as those used for the same as the rest of the GMP (refer to Chapter 1).

ORGANIZATION OF THE PLAN

This chapter is divided into four sections. Wilderness management information is presented in a progression from the general to the specific. Section 1 describes the purpose and structure of the plan. Section 2 introduces the reader to the Cebolla Wilderness, while Section 3 describes unique features of the unit. Section 4 presents the basic management guidance provided by broad national goals, and one additional goal specific to the Cebolla Wilderness. The wilderness management program is presented in Section 5. Section 6 is the environmental analysis for the wilderness management plan.

Specific management objectives are described for seven overall issues identified by the public and BLM resource specialists. They include: naturalness, recreation, range management, wildlife habitat management, scientific study, cultural resources, and Native American concerns. Each objective describes wilderness conditions to be achieved to assure progress toward the established goals. The current situation, program management assumptions, and management policies are also described for each issue. Specific elements of concern related to each issue are then described, followed by specific management prescriptions and actions for each element. The management prescriptions and actions have been designed to help attain the conditions described in each issue's objective. The management prescriptions and actions were developed using existing inventories, current knowledge of resources, public input, and the conditions existing at the time of wilderness designation. A summary of the wilderness issues and related elements follows:

Wilderness Issue	Specific Element
Naturalness	Restoration Resource Protection
Recreation	Visitor Management Interpretation and Public Education
Range Management	Desired Plant Communities Range Improvements
Wildlife Habitat Management	Special Use Areas Species Management
Scientific Study	Research and Data Collection
Cultural Resources	BLM Authorized Actions Vandalism and Surface Collecting Natural Deterioration Public Information and Education
Native American Uses	Native American Concerns

As indicated in Chapter 1, the implementation and monitoring chapters have been deferred to the Final GMP, after the public has commented on the proposed prescriptions and actions. The monitoring and implementation chapters will describe the detailed tasks necessary to achieve the prescriptions and actions. They are equivalent to site planning, and will include priority of implementation and basic costs. The Limits of Acceptable Change (LAC) monitoring system will be used for the Cebolla Wilderness, as well as the remainder of El Malpais Natural Conservation Area.

Section 2
Wilderness Overview

BACKGROUND AND LOCATION

The Cebolla Wilderness Unit consists of 62,800 acres located on the east side of the NCA. The location and boundaries of the unit are shown on Map 4-1.

The Cebolla Wilderness Unit is comprised of four former wilderness study areas (Pinyon, Rimrock, Little Rimrock, and Sand Canyon) that were inventoried and found suitable for wilderness designation (USDI, BLM 1980 and 1988). The four wilderness study areas were found to be predominantly natural and to exhibit outstanding opportunities for primitive and unconfined recreation. Human impacts are rare, consisting of temporary disturbances of soil and vegetation in camp areas. Disturbances are visually subtle, generally recovering on an annual basis. The Cebolla Wilderness Unit is also particularly rich in supplemental values which include ecological complexity, scenic values, abundant wildlife, and a high density and variety of prehistoric and historic cultural resources.

The Cebolla Wilderness is administered by BLM offices in Grants and Albuquerque. The Grants Field Station provides on-the-ground presence and operational management. The Rio Puerco Resource Area and the Albuquerque District Office, both in Albuquerque, provide other support.

OWNERSHIP AND BOUNDARY DESCRIPTION

The Cebolla Wilderness Unit contains both federal and private lands. Private inholdings include surface and subsurface estate (1,500 acres). The King Brothers are the primary private landowner, with two others having smaller inholdings. These inholdings, surface and subsurface, are high priorities for acquisition identified in the Land Protection Plan (refer to Appendix B).

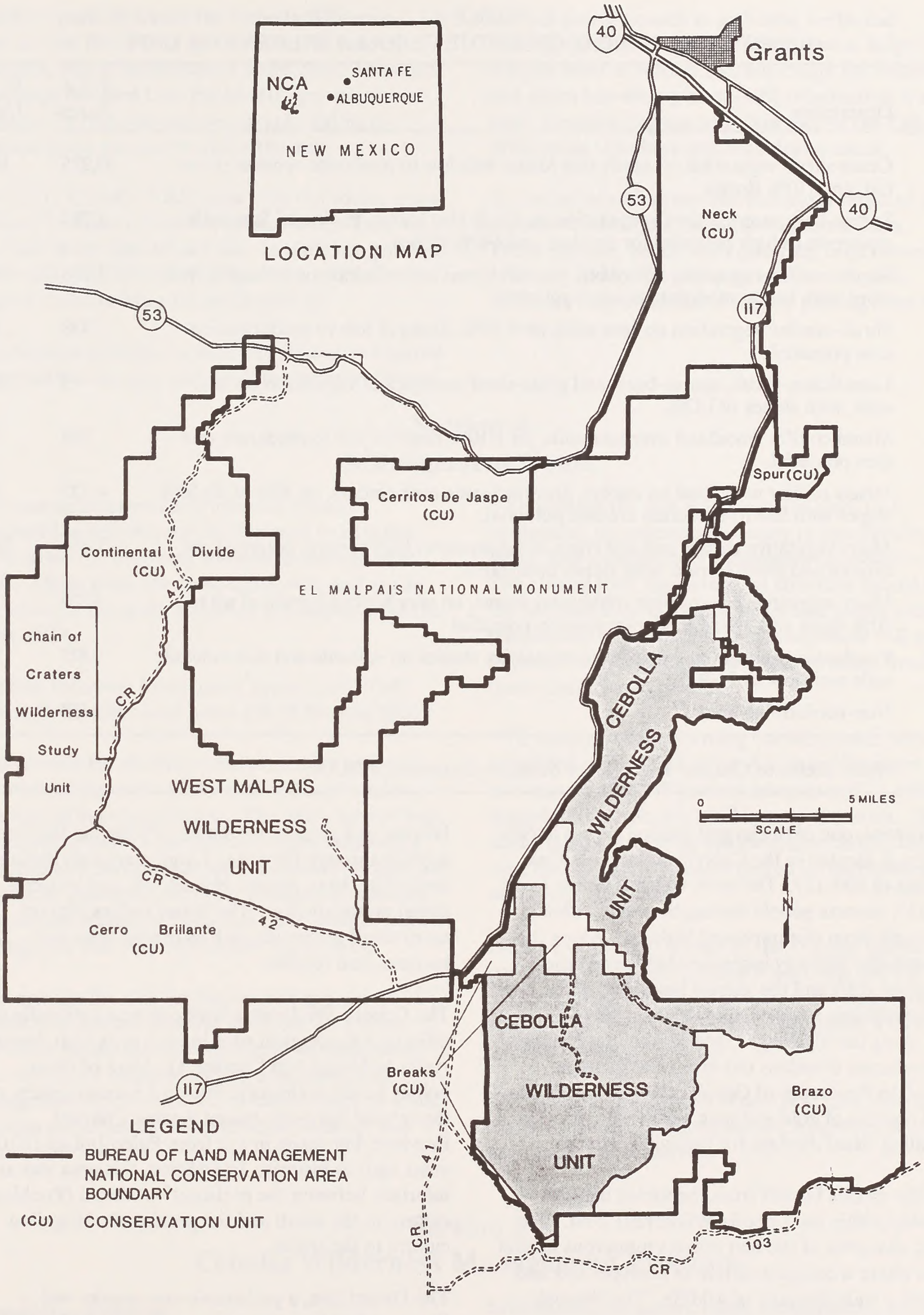
The exterior boundary of the Cebolla Wilderness Unit is defined by roads and the boundary of the Acoma Indian Reservation. The western boundary parallels NM 117 (refer to Map 4-1) until the highway turns southwest. Land status defines the boundary south of this point until it meets a utility line paralleling the Tank Canyon Road. It proceeds southwest along the utility line and the Tank Canyon Road until it intersects a primitive road. Primitive roads define the entire southeastern margin of the wilderness. The eastern boundary is generally defined by the top of Cebollita Mesa, which is the boundary of the Acoma Reservation. The northern boundary is formed by the block of Acoma lands which are within the NCA boundary but not part of the NCA.

As required by the El Malpais legislation, a complete description of the wilderness boundary was submitted to Congress in March 1990. A complete set of 7.5 minute topographic maps illustrating the boundaries is available at the Rio Puerco Resource Area Office in Albuquerque.

Section 3
Unique Features of the Cebolla Wilderness

The Cebolla Wilderness contains a variety of resource values. The unit is a fascinating picture of diversity, which is manifested in unique visual qualities and a rich and varied wildlife habitat. This diversity provides unique opportunities for visitors to view varied wildlife within scenic areas that are located in proximity to each other. Table 4-1 contains brief descriptions and quantification of the diverse ecotypes represented in the Cebolla Wilderness Unit, as described by Biophysical Land Units (discussed more fully in Chapter 1 and displayed on Map A).

The numerous mesas, canyons, ridges, and broad valleys that characterize the unit support a complicated pattern of open mesas, conifer forest, pinon-juniper woodlands, and grasslands. The high mesas provide vistas of volcanic fields extending for long distances. Sandstone bluffs and ridges rise above broad grassy valleys and alluvial fans.



MAP 4-1
CEBOLLA WILDERNESS UNIT

TABLE 4-1
BIOPHYSICAL LAND UNITS IN THE CEBOLLA WILDERNESS UNIT

BLU	Description	Total Acres	% of Unit
A	Grass-shrub vegetation on sandy clay loams with low to moderate erosion potential, on 1-10% slopes.	10,225	16
B	Sparse-bare or grass-shrub vegetation on sandy clay loams, in alluvial fans with moderate to high potential for erosion, and 1-10% slopes.	1,792	3
C	Shrub-conifer vegetation on cobbly, gravelly loams over cinders, on hills of 3-50% slope with low to moderate erosion potential.	3,786	6
D	Shrub-conifer vegetation on lava soils, on 1-10% slopes of low to moderate erosion potential.	338	.5
F	Lava-lichen-shrub, sparse-bare, and grass-shrub complex of vegetation on lava soils, with slopes of 1-12%.	5	.01
G	Mixed conifer woodland over lava soils, on 1-10% slope of low to moderate erosion potential.	788	1
H	Mixed conifer woodland on cobbly, gravelly loams over cinders, on hills of 10-50% slopes with low to moderate erosion potential.	4,727	8
I	Many vegetative classes and soil types of moderate to high erosion potential, on broken and steep terrain, with slopes up to 60%.	33,431	54
J	Many vegetative classes over cobbly clay loams, on very broken terrain of up to 60% slope and low to moderate erosion potential.	4,371	7
K	Ponderosa parkland and deciduous vegetative classes on volcanic and non-volcanic soils and slopes of 1-30%.	2,815	5
	Non-conforming area	123	.2

Note: Refer to Chapter 1 for a more detailed discussion of BLUs.

La Ventana, one of the largest natural arches in New Mexico, is located in the Cebolla Wilderness Unit, just east of NM 117. The arch, which is visible from NM 117, attracts people driving by and is within a short walk from this improved highway. Along the Narrows, the highway is pinched between vertical sandstone cliffs and the surreal landscape of the lava flows, providing a spectacular drive for visitors traveling along the highway. Upon leaving the Narrows, the landscape broadens out into a flat meadow formed by the mouth of Cebolla Canyon where seasonal clusters of gold and pink wildflowers provide appealing visual displays for highway travelers.

Wildlife species benefit from the varied habitats available within the Cebolla Wilderness Unit. The mixed character of the unit creates numerous habitat edges where a complex system of ecotypes mix and support a wide diversity of wildlife. The rimrock country and vertical sandstone escarpments are prime raptor nesting habitat. Birds of prey in the area include golden eagles, red-tailed hawks, prairie falcons, and great horned owls. Peregrine falcons migrate through the area. Large mammals include mule deer, bear, coyote, bobcat, fox, and an occasional mountain lion. The broad valleys support many small mammals such as prairie dogs and badgers, and reptiles.

The Cebolla Wilderness Unit contains nationally significant archeological sites in extremely high densities (refer to Map 1-3 in Chapter 1). Most of them belong to the prehistoric Pueblo Chacoan system or the related but more recent Acoma Cultural Province, but range in age from Paleo-Indian (10,000 years ago) to historic. In addition, this area was as an interface between the prehistoric Anasazi (Pueblo) culture to the north and the prehistoric Mogollon culture to the south.

The Dittert Site, a prehistoric community with a Chacoan building, great kiva, and prehistoric road, is listed on the National Register of Historic Places. Other key cultural resource properties that are wholly or partially within the Cebolla Wilderness Unit are the Pinole Site and the Cebolla Canyon Complex, which includes the Citadel Site. These are both large fortified Late Pueblo III aggregated villages. Petroglyphs and pictographs dating to Anasazi times also occur within the unit.

The entire Cebolla Wilderness Unit lies within areas claimed by Acoma Pueblo and the Navajo Tribe on the basis of aboriginal land use. In addition, portions of the unit are claimed by the pueblos of Zuni and Laguna (refer to Map 1-2 in Chapter 1).

The Acomas continue to maintain shrines and sacred places within the unit, and use it for other traditional cultural practices such as gathering herbs and hunting. The occurrence of several sweat lodges in the unit hints at Navajo use, but except for hunting and pinon harvesting, no specific information is available. Ongoing Laguna and Zuni uses of the Cebolla Wilderness Unit have not been documented.

A number of well-preserved historic homestead sites are also found in the Cebolla Wilderness Unit. These remains, which were generally used between 1920 and 1960, offer glimpses into a rural, self-sufficient way of life that is rapidly passing from the American scene.

Section 4
Management Goals

The management prescriptions and actions developed in this chapter are designed to help the BLM attain the following wilderness management goals. These goals are compatible with, and are an extension of, the goals described in Chapter 2 for the entire NCA.

The four following broad goals apply to all BLM-administered wilderness areas (BLM Manual 8560):

* To provide for the long-term protection and preservation of the unit's wilderness character under a principle of non-degradation. The unit's natural condition; opportunities for solitude; opportunities for primitive and unconfined types of recreation; and any ecological, geological, or other features of scientific, educational, scenic, or historical value present will be managed so that they will remain unimpaired.

* To manage the unit for the use and enjoyment of visitors in a manner that will leave the area unimpaired for future use and enjoyment as wilderness. The wilderness resource will be dominant in all management decisions where a choice must be made between preservation of wilderness character and human use.

* To manage the unit using the minimum tool, equipment, or structure necessary to successfully, safely, and economically accomplish the objective. The chosen tool, equipment, or structure should be the one that least degrades wilderness values either temporarily or permanently. Management will seek to preserve spontaneity of use with as much freedom from regulation as possible.

* To manage nonconforming but acceptable uses permitted by the Wilderness Act and subsequent laws in a manner that will prevent unnecessary or undue degradation of the unit's wilderness character. Nonconforming uses will be the exception rather than the rule; therefore, emphasis is placed on maintaining wilderness character.

Because of the importance of the cultural resources contained within the Cebolla Wilderness and the emphasis placed on managing them for long-term scientific use by the El Malpais legislation, a fifth goal has been added:

* To manage the Cebolla Wilderness Unit with an emphasis on the preservation and long-term scientific use of cultural resources.

Section 5
Cebolla Wilderness Management Program

INTRODUCTION

Seven major issues were identified for the Cebolla Wilderness during the planning process. They are naturalness, recreation, range management, wildlife habitat management, scientific use, cultural resources, and Native American uses. Each issue has at least one overall objective to guide future management direction. The current situation described for each issue is followed by management assumptions and policy statements, and management prescriptions and actions.

The "Current Situation" section describes the existing resource condition including problems, trends, and uses. The "Assumptions" section explains expectations based on the current situation. The "Policy" section enumerates policy statements pertinent to the existing resources, management situation, and planning statements.

Management prescriptions and actions for each issue are discussed by specific elements of concern that expand upon each individual issue. Specific management prescriptions and actions are displayed in a table for each management element. These are designed to help attain the conditions described in each of the issue objectives.

This plan for managing the Cebolla Wilderness Unit has been developed within a well-defined set of parameters. These parameters result from the El Malpais legislation and its emphases; other laws that apply to the lands and resources in the unit; BLM program policy, guidance, operating procedures, and fiscal constraints; data about the ecotypes contained in Cebolla Wilderness and their capabilities and limitations; public input; and assumptions about how these and other factors may affect management of the unit. All of these parameters taken together provide the framework for analyzing and recommending actions to be taken in managing the Cebolla Wilderness Unit.

NATURALNESS

Management Objective for Naturalness

PROTECT AND PRESERVE OVER THE LONG TERM, THE NATURAL CHARACTER OF CEBOLLA WILDERNESS BY ALLOWING NATURAL SYSTEMS TO OPERATE FREELY WITH MINIMAL HUMAN INTERFERENCE.

Current Situation

General Information: While the Cebolla Wilderness is considered predominantly natural, it nevertheless has been influenced by humans to some degree. Historic use includes agriculture, fuelwood gathering, logging, and grazing. More recent uses include grazing, scientific research, and dispersed recreation. These uses have resulted in the development of roads, reduced vegetative cover, soil erosion, earthen dams, fencelines, and an unnatural fuel build-up resulting from continuous fire suppression. Excessive fuel build-up could result in an unnatural pattern of large scale burning, exposing highly erodible soils.

Approximately 30 miles of vehicular ways (unmaintained roads and two-tracks) that existed prior to wilderness designation are readily accessible from eight points of entry along the boundaries of the Cebolla Wilderness. These have resulted in vehicular trespass in the wilderness although the wilderness boundaries are signed. They are frequently associated with small areas traditionally used for hunter camps. These campsites usually receive seasonal use and readily revegetate; some do exhibit limited compacted soils and vegetative clearing.

Approximately 18 miles of these vehicular routes will continue to receive limited use by allottees to maintain existing range improvements. This use will occur according to the terms of the Cebolla Wilderness Range Improvement Maintenance Plan (refer to Range Management section below).

The mesas, canyons, and valleys of the Cebolla Wilderness comprise a watershed which drains into Cebolla Canyon and ultimately flows outside of the wilderness boundaries, affecting both private and public property. Downcutting by ephemeral and perennial streams has created deep gullies along primary and secondary drainages. Naturally occurring highly erodible soils (BLUs B and I) complicate the situation since separating human-caused erosion from accelerated erosion due to climatic changes (Maxwell, et al. 1989) or to geologic processes is difficult. This erosion threatens wildlife habitat and cultural and historic resources within the Cebolla Wilderness (refer to Wildlife Habitat Management and Cultural Resources sections, below), both of which are components of the wilderness resource. No adequate study exists that identifies the specific causes of erosion, or assesses their potential for mitigation.

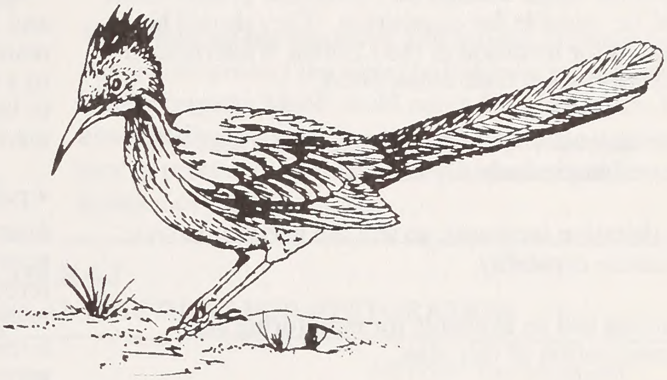
Most waters in the unit are developed for cattle or wildlife. Two springs located on private lands contiguous with wilderness boundaries offer an important riparian habitat worthy of protection (refer to Wildlife Habitat section, below). The quality of waters in the Cebolla Wilderness is unknown.

Restoration: Maintenance and enhancement of naturalness is inherent in the goals set for the management of the Cebolla Wilderness Unit. At the heart of this focus is the concept of protecting natural systems and allowing them to operate freely, with minimal human interference. Since the Cebolla Wilderness has a history of human use that has modified the functioning of natural ecological processes, some manipulation of natural processes is warranted. Management strongly emphasizes maintaining, and if necessary, enhancing the natural ecosystem and its processes. It is preferable to restore the watershed which feeds the canyons and drainages of Cebolla Creek through the use of natural processes. These natural processes may include the use of fire, and enhancement of natural vegetation.

Adequate data are lacking on the specific causes of erosion, both natural and human caused. Eighteen miles of vehicular routes not being used on a limited basis by allottees should be restored to natural conditions. Restoration of riparian habitat contiguous with the Cebolla Wilderness can occur only if these private lands are acquired by the federal government. NCA managers would make recommendations regarding wilderness or non-wilderness status for these lands at that time.

Protection: Within the Cebolla Wilderness, visitors have ready, non-mechanized access to sensitive habitats, cultural resources, and unique geologic features. This easy access combined with an increased demand for day-use wilderness areas close to urban populations (refer to Recreation section, below) will likely result in greater recreation use of the Cebolla Wilderness. This will increase opportunities to introduce visitors to a variety of natural and cultural resources, and to develop an understanding and appreciation of the resources of the Cebolla Wilderness. However, this opportunity could also result in damage to cultural resources and unique and sensitive habitats. Sensitive habitat is determined by the survival needs of each species of plant or animal, which vary considerably.

The very erodible soils found in BLUs B and I make prevention of additional human-caused erosion an important part of management since existing patterns of erosion threaten sensitive habitats in those BLUs. Any further erosion also threatens existing cultural resources. A more complete discussion of sensitive habitats and cultural resources in the Cebolla Wilderness is found in the Wildlife Habitat Management and Cultural Resources sections, below.



The terrain and vegetation of the Cebolla Wilderness are complex and offer a variety of opportunities for viewing scenic vistas of great distance. Such viewsheds make any deterioration of visibility readily apparent. Cebolla is being managed as Visual Resource Management Class I which provides for primarily natural ecological change.

Approximately 1,500 acres of private inholdings occur within the boundaries of the Cebolla Wilderness. They are used primarily for grazing. No further development of these inholdings is currently proposed. However, acquisition of these inholdings would assure that no future incompatible uses would occur.

Protection of Cebolla's naturalness is amplified in all of the issue discussions which follow.

Assumptions

* Actions need to be taken to prevent any future damage from unauthorized uses.

* Erosion from natural and human-caused sources will continue.

* Vehicular trespass will continue unless sufficient barriers are constructed to restrict access to the interior of the wilderness.

* The nonconforming but acceptable use of established livestock grazing will continue.

* Limited vehicular access by allottees will be regulated by the terms set forth in the Range Improvement Maintenance Plans (USDI, BLM 1990).

* Riparian values located on contiguous private lands would be valuable for acquisition. They should be evaluated for inclusion in the Cebolla Wilderness or the Conservation Unit of the NCA.

* Recreational use of the Cebolla Wilderness will increase, particularly day use.

* As visitation increases, so will the need for search and rescue capability.

* Funding will be available for monitoring and implementation of this plan.

Policy

* All effects of unauthorized uses will be rehabilitated and restored to a natural condition.

* The BLM wilderness management policy (Manual 8560) will be used to guide management decisions or plan modifications.

* Wilderness areas generally appear to have been affected primarily by the forces of nature, with the imprint of man generally unnoticeable. Wilderness policy does allow for some manipulation of wilderness resources to bring ecosystems back into natural balance where humans have disturbed natural cycles.

* Management actions prescribed to maintain or enhance existing values, or rehabilitate the wilderness from past human actions must utilize the tools, equipment, or structures which least degrade wilderness values either temporarily or permanently.

* Where the exercise of rights of access to surrounded private land would be detrimental to wilderness values, efforts to acquire such land by purchase or by exchange will be pursued.

* Persons and their successors in interest who own land completely surrounded by wilderness must be given such rights as may be necessary to assure adequate access to that land. Adequate access (identified by the BLM) is defined as the combination of routes and modes of travel which will cause the least impact on the wilderness resource while still assuring reasonable access.

* The BLM allows fire to play a natural role in the wilderness ecosystem. All fires must be controlled to prevent loss of human life or private property within wilderness areas or to prevent the spread of fire to areas outside of the wilderness where human life, resources, or property may be threatened. Human-caused fires must be prevented and/or controlled unless the fire meets wilderness fire management objectives.

* Natural fire is part of the ecology of the wilderness and human efforts to ban this agent may have resulted in significant ecological changes. To return to a more natural state, natural fires may be allowed to burn in accordance to an approved Fire Management Plan.

* Prescribed burning may be used to reintroduce or maintain the natural condition of a fire-dependent ecosystem; where past fire control measures interfered with natural ecological processes; where a primary value of the wilderness would be perpetuated as a result of burning; or where a threatened or endangered species would be perpetuated. Prescribed burning must occur only where natural fire does not meet wilderness fire management objectives and will be allowed on a case-by-case basis.

* Watershed restoration may be undertaken where deteriorated soil and hydrologic conditions caused by human beings or human influences create a serious threat or loss of wilderness values; or where, even though not human-caused, such conditions present a definite hazard to life or property; or where such conditions could cause serious deterioration of important environmental quality outside the wilderness.

* Disturbed areas resulting from human activity which cannot rehabilitate naturally in a reasonable period of time will be reclaimed, recontoured to a natural slope, and reseeded with native plant species to establish satisfactory ground cover equivalent to that existing prior to disturbance.

* Leave in place all standing dead vegetation, but allow dead and down vegetation to be used for campfires in amounts that can be replaced annually through natural accumulation.

* Prevent soil compaction resulting from human use where natural plant establishment and succession is precluded.

* Minimize the establishment of impromptu, secondary trails.

* The BLM manages designated wilderness areas for Class II air quality unless they are reclassified by the state. These standards will be maintained.

* BLM will monitor select air quality parameters under cooperative agreement with the National Park Service.

* Visual Resource Management Class I objectives will be maintained.

Management Prescriptions and Actions for Naturalness

The following prescriptions and actions are recommended to restore the Cebolla Wilderness to a natural condition. Existing impacts have resulted from both authorized and unauthorized actions occurring within the last 50 years.

The following prescriptions and actions are recommended to protect the Cebolla Wilderness from any further impacts which could result from authorized or unauthorized actions (except for those actions necessary to protect the wilderness resource, or public health and safety).

TABLE 4-2
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR RESTORATION

		Affected Environment	
Management Prescription	Action	Natural (BLUs)	Human
Restore natural ecological processes	Continue to study grazing trends	ABCIK	3 grazing allotments in Cebolla Wilderness
	Implement change in grazing practices if trend studies indicate the need		
	Develop allotment management plans w/consideration given to riparian zones		
	Develop allotment management plans w/consideration given to uplands & their effects on riparian zones		
Deter human-caused erosion	Inventory to determine where erosion is occurring & the percent caused by natural processes & percent caused by humans		
	Assess if restoration will occur by natural means or if active rehabilitation is necessary		
	Complete watershed plan detailing how any human-caused erosion can be restored		
Restore approximately 22 miles of old vehicular ways	Reseed w/native species if natural revegetation does not occur		
Use natural & prescribed fire as a management tool	Develop Fire Management Plan based on issue prescriptions & actions described in this plan	ABCIK	Human influences have interfered w/natural ecological processes
	Identify & map areas where naturally occurring or prescribed fires would maintain vegetation		Must consider effects of fire on natural resources
	Identify & map areas where cultural & historic resources would prohibit use of fire	ABCIK	Must differentiate between nonhistorical & historical trash
	Identify & map areas where reseeding may be necessary after fire		
Restore old hunter camp in T5N, R10W, Section 22	Remove nonessential improvements for hunter camp	ABCIK	Visitors expect wilderness to be dominated by natural processes
	Reseed w/native species if natural regeneration does not occur		
Restore natural scenic quality	Evaluate structures related to authorized uses & determine methods of minimizing visual impacts		

TABLE 4-3 a
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR RESOURCE PROTECTION

Management Prescription	Action	Affected Environment	
		Natural (BLUs)	Human
Provide resource protection by promoting respect for natural resources of Cebolla Wilderness	Inform public about unusual geologic features of unit, including La Ventana Natural Arch & sandstone bluffs	I	Major attraction
	Inform public of varied wildlife & plants found in unit	All	Attractive to campers, hunters, photographers
Deter erosion of sensitive soils from steep terrain	Encourage recreational use in areas determined to be less sensitive	I	Redirecting traffic should protect soils
	Place trails away from BLUs B & I		
	Manage vegetation for increasing cover		Range management practices may need to be renegotiated
Protect playas, drainages, & wetlands	Treat as sensitive habitat	AB	Redirect recreation use
	Warn public of negative impacts resulting from camping near such areas.		
	Acquire ___ acres of private property contiguous w/Cebolla Wilderness containing critical riparian habitat		
Assure natural processes w/minimum of human interference	Acquire private land & minerals by purchase or exchange as outlined in Land Protection Plan (Appendix B)	ABCIK	Development of private inholdings could be incompatible w/ wilderness objectives
	Identify & establish least damaging access routes w/private landowners		
	Implement a program of low impact use of wilderness by horseback rides.		
	Monitor to identify excessive soil compaction and loss of ground cover, along designated trails and camp areas.		
	Acquire contiguous private edge holdings which include critical riparian resources.	B	Human impacts frequently occur along trails & camp areas.
	Monitor to identify the creation of informal, secondary trails.		
	Monitor to identify any removal of dead vegetation for camp fires that exceed the amount that can be replaced annually through natural succession.		
Identify changes to natural processes before they become unacceptable	Establish the Limits of Acceptable Change (LAC) monitoring system (Appendix J) including a visual impact evaluation system		Human use of wilderness will impact resources
Deter unauthorized vehicular traffic into wilderness	Post additional signs along wilderness boundaries	ABCIK	Two tracks have historically been used
	Monitor & patrol for unauthorized access		
	Physically close vehicular access by fencing or barricading at wilderness boundary		

RECREATION

Management Objective for Recreation

PROVIDE FOR PUBLIC RECREATION DEPENDENT UPON A WILDERNESS SETTING IN A MANNER CONSISTENT WITH THE PRESERVATION OF WILDERNESS, AND CHARACTERIZED BY NATURALNESS AND OUTSTANDING OPPORTUNITIES FOR SOLITUDE.

Current Situation

General Information: The primitive recreation potential of the Cebolla Wilderness is derived from its diverse, broken terrain, variety of wildlife, dramatic vistas, and prehistoric and historic resources. The area offers opportunities for hiking, photography, backpacking, and primitive camping. Because of the diverse ecotypes of the Cebolla Wilderness (refer to Map A), an abundant and varied wildlife population offers excellent opportunities for wildlife viewing. Isolation from the sights and sound of others is highly probable, particularly in the broken, rugged terrain exhibited in BLUs I and J (Map A). Visitors can experience independence, closeness to nature, and self-reliance within an environment that offers a high degree of challenge and risk. This diverse and complex land base produces dramatic contrasts in form, line, shape, and color, which in turn enhance the unit's visual appeal to visitors who are seeking a primitive natural setting.

Numbers and distribution of visitors to the wilderness are not yet completely documented. The majority of known visitor use consists of sightseeing from vehicles on NM 117 and short walks into the northern portion of the wilderness by day hikers and photographers. Some use occurs in the southern end but this portion of the wilderness is not as readily accessible. Three key access points to the Cebolla Wilderness are located at La Ventana Natural Arch, South Big Narrows, and at the Dittert Site. (Refer to Chapter 3, Conservation Unit, for descriptions of these sites.)

Current trends indicate a strong pattern of day use for the Cebolla Wilderness. BLM Grants Field Station personnel lead small tours to some of the cultural resources in the southern, more remote portion of the Cebolla Wilderness. At present, natural processes are not noticeably affected by the presence or actions of recreators in the Cebolla Wilderness.

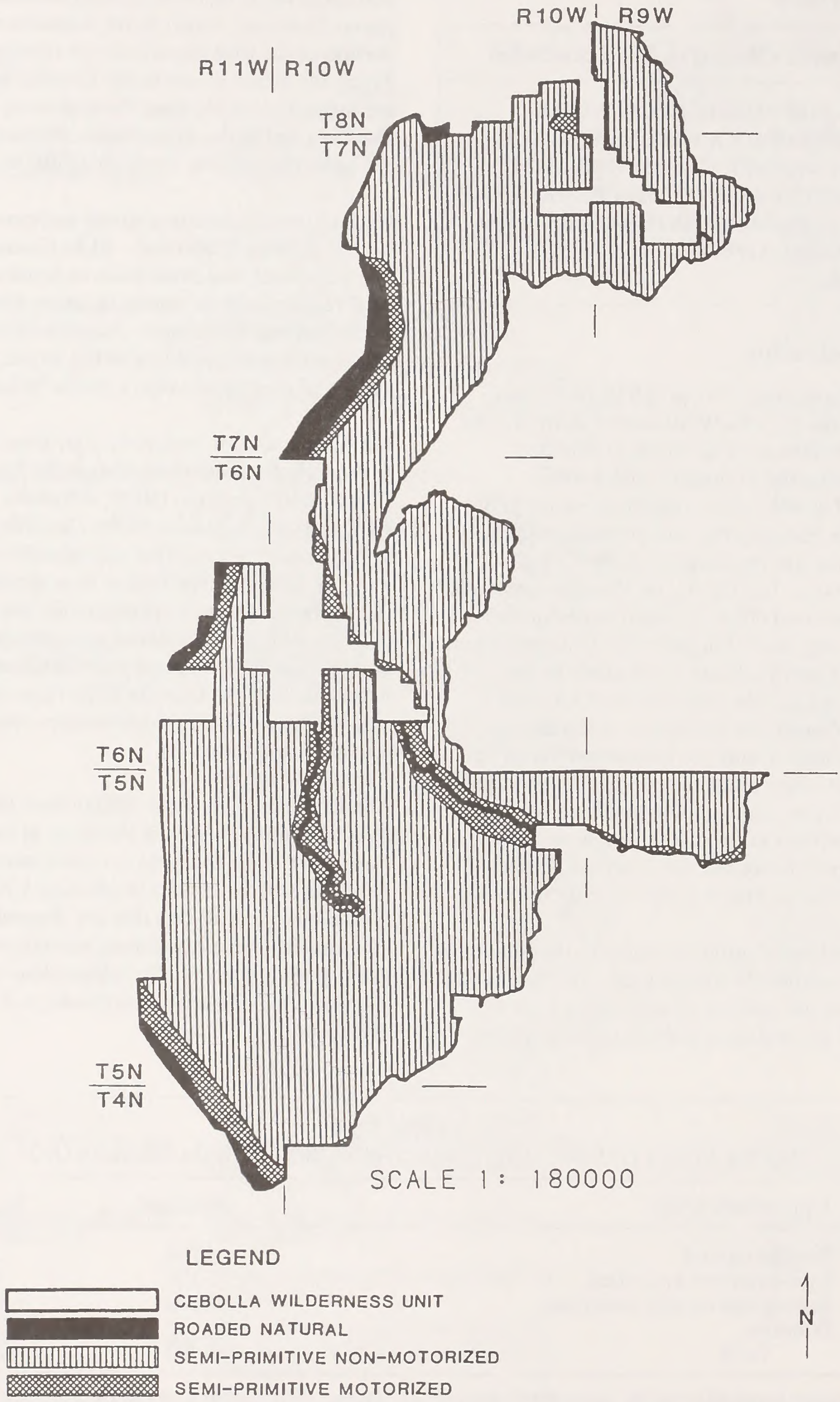
The system used to inventory recreation opportunity in the Cebolla Wilderness Unit is the Recreation Opportunity Spectrum (ROS; Appendix F). The ROS provides a framework for classifying outdoor settings and the recreation opportunities dependent on these settings. The system uses specific criteria to inventory recreational opportunities and to recommend management guidance for each class. (Refer to Appendix F for summary of this system.) All 62,800 acres of the Cebolla Wilderness have been classified according to this inventory system (refer to Table 4-3 and Map 4-2).

The ROS classifies about 55,600 acres (89 percent) of the Cebolla Wilderness is classified as semi-primitive non-motorized. The semi-primitive non-motorized zones within the Cebolla Wilderness Unit provide recreation opportunities that are dependent on maintaining freely functioning ecosystems. These ecosystems are essentially independent of evidence of humans, administrative restrictions, and onsite controls.

TABLE 4-3b
RECREATION OPPORTUNITIES IN THE CEBOLLA WILDERNESS UNIT

Opportunity Class	Acreage*	% of Unit
Roaded natural	1,700	3
Semi-primitive motorized	5,100	8
Semi-primitive non-motorized	55,600	89
Primitive	0	0
Total	62,400	100

Note: *Acreage is rounded to the nearest hundred acres. Of the total 62,800 acres in the Cebolla Wilderness Unit, 400 contain non-conforming landcover that does not fit the model used to calculate these acreages.



MAP 4-2
RECREATION OPPORTUNITY SPECTRUM IN THE CEBOLLA WILDERNESS UNIT

Corridors along NM 117 and the Tank Canyon Road make up the approximately 3 percent of the wilderness that shows moderate evidence of human modification and technology, management restrictions and onsite controls. Because NM 117 is paved, this corridor provides a greater opportunity for easy access and day use of the unit. The remainder of the wilderness unit, about eight percent, is along primitive dirt roads where only subtle modification by humans, management restrictions, and onsite controls occur.

The natural settings available to the recreator are reflected by the BLUs present. Each BLU represents a different combination of natural variables. Each provides different recreation attributes (refer to Tables 1-2 and 1-3, Chapter 1). Natural settings of BLUs A,B,C,H,I,J, and K predominate in the Cebolla Wilderness. Small amounts of BLUs D,F, and G are also present (refer to Map A).

The Cebolla Wilderness Unit is within a 2- to 3-hour drive of the two largest population centers in New Mexico, Albuquerque and Santa Fe. Designated wilderness areas within 100 miles of the Cebolla Wilderness Unit are shown on Map 4-3. Those other areas within a comparable driving time from Albuquerque and Santa Fe are all above 7,000 feet.

The lower elevation environments of the Cebolla Wilderness Unit provide a different recreational setting for visitors. These environments also expand the range of visitation since they are more accessible during the winter season than the wilderness areas at higher elevations. The combination of a varied recreation setting and an expanded range of user-days accentuate the unit's ability to accommodate the day-use trend.

Visitor Management: Managing an increase in visitor use, especially in conjunction with Native American traditional uses, was raised as an element of concern during public meetings.

Legislative parameters and management goals for the Cebolla Wilderness Unit speak strongly to three needs. The first need is to ensure reasonable access to and primary for Native American traditional and religious purposes. This need may result in closure of portions of Cebolla Wilderness to the general public on a temporary basis to ensure privacy. The second need is to manage the unit with a strong emphasis on retaining its high-quality research potential for cultural resources. The third is to allow recreation use while protecting the natural, physical, and social setting of the Cebolla Wilderness.

Recreation use of the Cebolla Wilderness Unit must occur hand-in-hand with protection of the wilderness resource, leaving it unimpaired for future use as wilderness. Easily accessible and unique features such as La Ventana Natural Arch will draw visitors, and will require development designed to direct use and protect against resource damage. All development to facilitate recreation use of the Cebolla Wilderness will occur outside of the wilderness boundaries within the Conservation Unit, where development is compatible with management goals (refer to Chapter 3 and Map B).

As wilderness visitor use is monitored, the BLM may need to develop other recreational facilities along the NM 117 corridor contiguous with the more remote portions of the NCA to protect wilderness character or provide primitive recreation opportunities. Information derived from monitoring of changes in visitor use patterns or in the naturalness of the wilderness must dictate future management actions.

Interpretation and Public Education: Interpretation and education can enhance the recreation experience, as well as contribute significantly to the preservation of wilderness character through influence on human behavior. To preserve an environment where dispersed and primitive recreation can occur, visitors must understand their responsibility to the land. Education and information can be used to impart this responsibility. (Refer to Chapter 9 for more detail on the interpretive and educational directions for the entire NCA, including the Cebolla Wilderness).

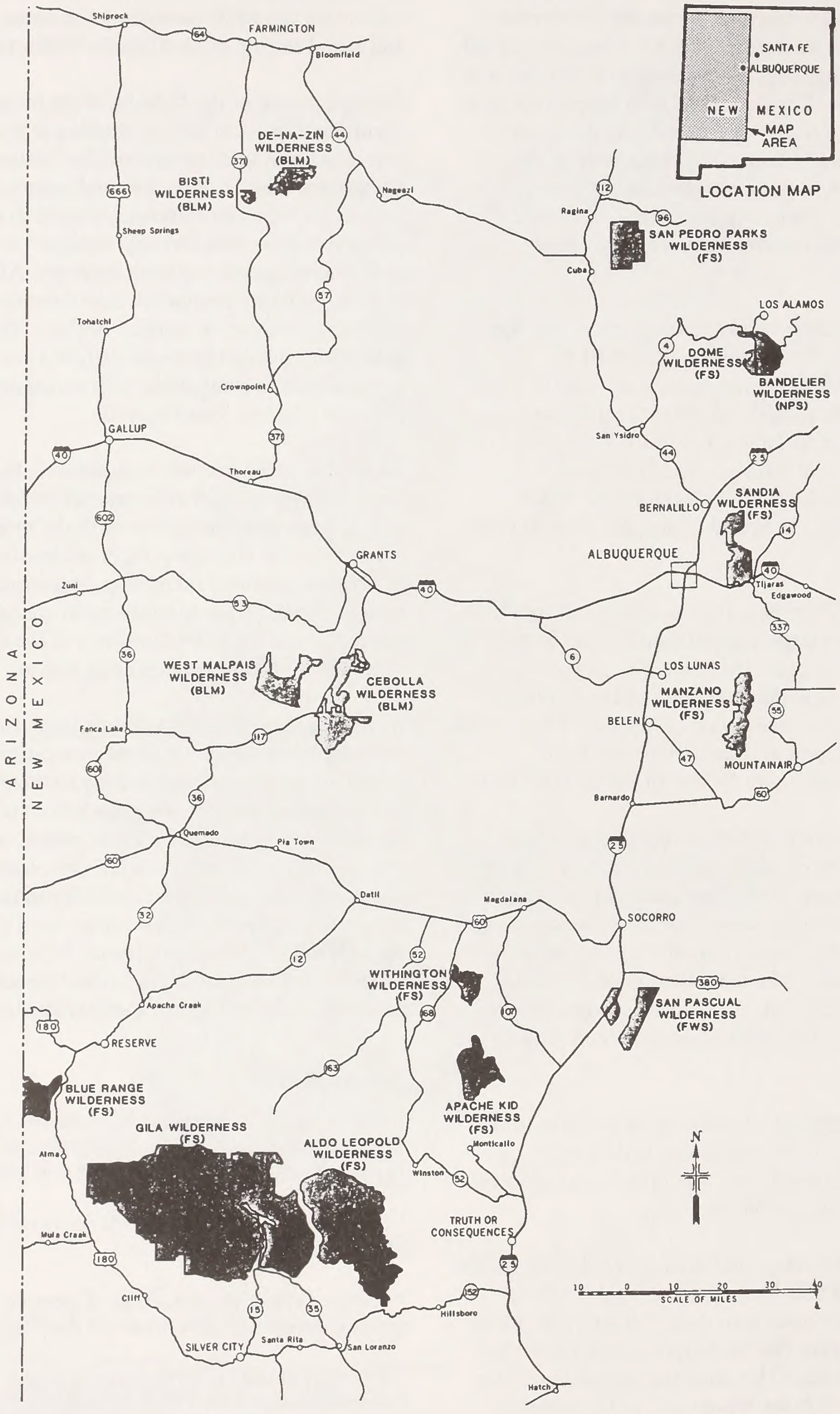
Assumptions

* Visitor use is expected to increase over the present. The portion of the Cebolla Wilderness along the NM 117 corridor will receive the most concentrated use.

* As visitation increases so will the need for search and rescue operations.

* Without effective protection of naturalness, primitive recreation opportunities will diminish.

* The opportunity to experience solitude may be diminished near NM 117 and the Tank Canyon Road, along cherry-stemmed roads, and adjacent to private inholdings.



MAP 4-3
WILDERNESS AREAS WITHIN 100 MILES OF THE NCA WILDERNESS AREAS

* The economic benefits tied to tourism described in Chapter 1 will influence visitor use in the Cebolla Wilderness.

* Conflicts between recreators and long-term scientific use of cultural resources may occur.

* The BLM is likely to receive applications for commercial use of the Cebolla Wilderness.

* The visitor must assume some risks in entering the wilderness as a consequence of isolation from the conveniences of technological world.

* Lands that provide primitive recreation opportunities are needed near urban centers (SCORP 1986).

* Funds will be available to implement this plan.

Policy

* An emphasis on indirect methods of visitor management will be maintained.

* Limit contact with administrative personnel.

* Direct methods of visitor management will be used where concentrated use is already occurring along NM 117.

* Management of visitor use will be the minimum necessary to provide for use of the area as wilderness, and to preserve the wilderness character of the area.

* Signs must be provided primarily for visitor safety and resource protection. Notices pertaining to regulations within the wilderness must be kept to a minimum and, where possible, be placed outside of the wilderness.

* Trail development will be used to direct visitors away from sensitive resource areas and areas of traditional Native American religious practices.

* New trails may be constructed only if they are needed to preserve wilderness values and resources and will not significantly degrade the naturalness or solitude of the area. Trail routes must be selected to provide scenic vistas and, where possible, a varied scene.

* Constructed trails will be no more than 24 inches wide and will follow natural contours where possible.

* Information about the Cebolla Wilderness will be made available without promoting the use of wilderness.

* The BLM will protect and preserve the natural character of the Cebolla Wilderness over the long term by allowing natural systems to operate freely with minimal human interference, and secondarily provide for public enjoyment of the area as wilderness. If conflicts arise between recreation or other visitor use and the preservation of natural systems, the preservation of natural systems will be favored.

* The BLM will develop facilities only if resource damage is threatened or health and safety issues arise.

* The BLM will maintain a diverse range of recreational opportunities for the public land user by maintaining a diverse land base.

* The BLM will minimize the establishment of hardened camp areas.

* The BLM will authorize only activities and uses which will not diminish wilderness character or the experience expectations of visitors.

* If conflicts arise between recreation use and the preservation of long-term scientific use of cultural resources, long-term scientific use will be favored.

* An emphasis on offsite user information will be maintained.

* Interpretation and education will be used to encourage a positive wilderness ethic.

* Hunting and trapping are permitted, subject to applicable state and federal laws.

* No commercial permits will be issued that are not compatible with wilderness, or that can be accommodated equally well outside of the Cebolla Wilderness.

Management Prescriptions and Actions for Wilderness

A combination of direct and indirect methods of visitor management is proposed in the following management prescriptions and actions. They focus on channeling visitor use to ensure that wilderness character is preserved, and that conflicts between visitors are minimized, while providing for recreational use of the Cebolla Wilderness as wilderness.

A comprehensive discussion of the overall Interpretive and Education program within the NCA (including the Cebolla Wilderness) is located in Chapter 9. The following prescriptions and actions are recommended to effectively protect the naturalness of the Cebolla Wilderness and to prevent its primitive recreation opportunities from diminishing.

TABLE 4-4
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR VISITOR MANAGEMENT

		Affected Environment	
Management Prescription	Action	Natural (BLUs)	Human
Provide day-use opportunities in high-use zone of Cebolla Wilderness (northern portion) & protect wilderness values by directing visitor use	Complete development of existing trail system at La Ventana Natural Arch (refer to Chapter 3)	I	Easy access requires direct management of people
	Maintain developed trail to arch		
	Provide parking outside wilderness boundary		
	Develop facilities at Natural Arch (refer to Chapter 3) including regulatory signs and safety information		
	Inventory at least 1/4-mile radius around proposed visitor use developments such as trailheads and trails for cultural resources		
	Use design factors to channel visitors away from vulnerable cultural resource areas or sensitive Native American use areas		
	Develop facilities at South Big Narrows (refer to Chapter 3) including regulatory signs & safety information	CI	Currently used for recreation in a high-use zone along NM 117
	Construct a trailhead into the Cebolla Wilderness at south end of the Narrows (refer to Chapter 3) including regulatory signs & safety information		
	Develop a foot trail along the sandstone rim from south end of the Narrows to overlook the arch (approximately 2.5 miles)	C	Provide scenic views, direct visitors in a high use zone
	Monitor recreational use of Cebolla Wilderness		
	Erect self-issued registration facility at access point		
	Develop self-issued registration form & distribute at the trailhead to gather visitor use data		
	Gather visitor use data at trailhead using direct contact with visitors		

TABLE 4-4 -- CONCLUDED

Management Prescription	Action	Affected Environment Natural (BLUs)	 Human
Protect cultural resources by directing visitor use at Dittert Site	Take actions listed in Chapter 3	B	Site w/ high interpretive potential
Develop indicators of change for recreational impact on cultural resources	Intensively surface inventory for cultural resources at Dittert Site		Visitor use will impact cultural resources
	Monitor visitor use at Dittert Site		
	Collect visitor use data at Dittert Site		
	Study impact of recreational use on cultural resources by monitoring for change in surface materials		No existing data
Protect visual resources	Construct trailheads outside of wilderness boundaries to blend in w/existing environment (VRM Class II standards)	BC	Visitors anticipate natural setting in relationship to wilderness
Provide for visitor safety	Coordinate search & rescue responsibilities through cooperative agreement w/ NM State Police, NPS, & local law enforcement	ABCIK	NM State Police has lead responsibility
	Develop search & rescue plan to include criteria under which vehicular or helicopter use will be allowed for life-threatening situations		Action plan will reduce unwarranted degradation
	Close trailheads to grazing, hunting & trapping (La Ventana & South Big Narrows, Dittert Site)	CI	Incompatible activity in high use area
	Monitor to identify future areas of concentrating recreation use for possible closure		
Protect wilderness resources & assure maintenance of primitive recreation opportunity	Develop questionnaire for gathering data on visitor experiences & perceptions	ABCIK	Primitive recreation experience dependent upon natural, social, & managerial setting
	Develop social limits of acceptable change for primitive recreation		
	Evaluate social limits of acceptable change annually using questionnaire & random surveys		
	Erect regulatory signs and safety information at trailheads (outside wilderness boundaries)	CI	
	Implement an effective patrol program	ABCIK	Human use will impact wilderness resource
	Staff w/rangers for wilderness patrol		
	Train personnel in patrol techniques & use resource specialists & volunteers to assist in wilderness patrols		Degradation of wilderness resource will diminish primitive recreation experience

TABLE 4-5
MANAGEMENT PRESCRIPTIONS AND ACTIONS
FOR INTERPRETATION AND PUBLIC EDUCATION

		Affected Environment	
Management Prescription	Action	Natural (BLUs)	Human
Implement interpretive objectives (refer to Chapter 9) to enhance visitor experience & facilitate a positive wildland ethic	Develop onsite interpretive opportunity at La Ventana Natural Arch parking lot (outside of wilderness boundary) Use trailheads to distribute information on resource protection & user responsibilities	B	Easily accessible site which lends itself to interpretation of the natural processes which shaped the landscape Information influences human behavior
	Develop onsite interpretive opportunity at the Dittert Site parking lot (outside of wilderness boundary)	B	Site which lends itself to interpretation of transition from Chacoan times to present
	Develop onsite interpretive opportunity at South Big Narrows parking lot (outside of wilderness boundary) At trailhead include an interpretive theme of wilderness as a resource, & wilderness test to emphasize low impact use (pack-it-in, pack-it-out)	B	Easily accessible site which can serve as a convenient trailhead into Cebolla Wilderness
Enhance visitors' recreation experience	Develop environmental education programs for use at Ranger Station and in local community Develop wilderness brochure which includes map, safety information, & low impact use techniques	All	Information will influence human behavior

RANGE MANAGEMENT

Management Objectives for Range Management

RANGE WILL BE MANAGED TO ALLOW GRAZING TO CONTINUE WHILE PROTECTING WILDERNESS VALUES, AND TO ACHIEVE AND CONSERVE DESIRED PLANT COMMUNITIES THAT BENEFIT LIVESTOCK AND WILDLIFE.
MANAGEMENT WILL EMPHASIZE BALANCE BETWEEN RANGE MANAGEMENT NEEDS AND THE PROTECTION OF WILDERNESS, WILDLIFE HABITAT, AND PRIMITIVE RECREATION.

Current Situation

General Information: Parts of three range allotments fall within the Cebolla Wilderness Unit boundaries (refer to Table 4-6). At least two BLUs fall in each allotment, with a total of ten BLUs in the unit (refer to Table 4-7). The BLUs are correlated to ecological range sites (potential plant communities) by the soils component that they share. The vegetation component of the BLUs identifies the existing plant communities. Each BLU with its unique combination of terrain/landform, soils, vegetation/land cover, and surface drainage responds differently to management prescriptions and actions (refer to Table 1-5, Chapter 1). Map 4-4 shows the three allotments as they are situated relative to the Cebolla Wilderness Unit's boundaries, and the BLUs found in each.

TABLE 4-6
GRAZING ALLOTMENTS PARTIALLY LOCATED IN THE CEBOLLA WILDERNESS

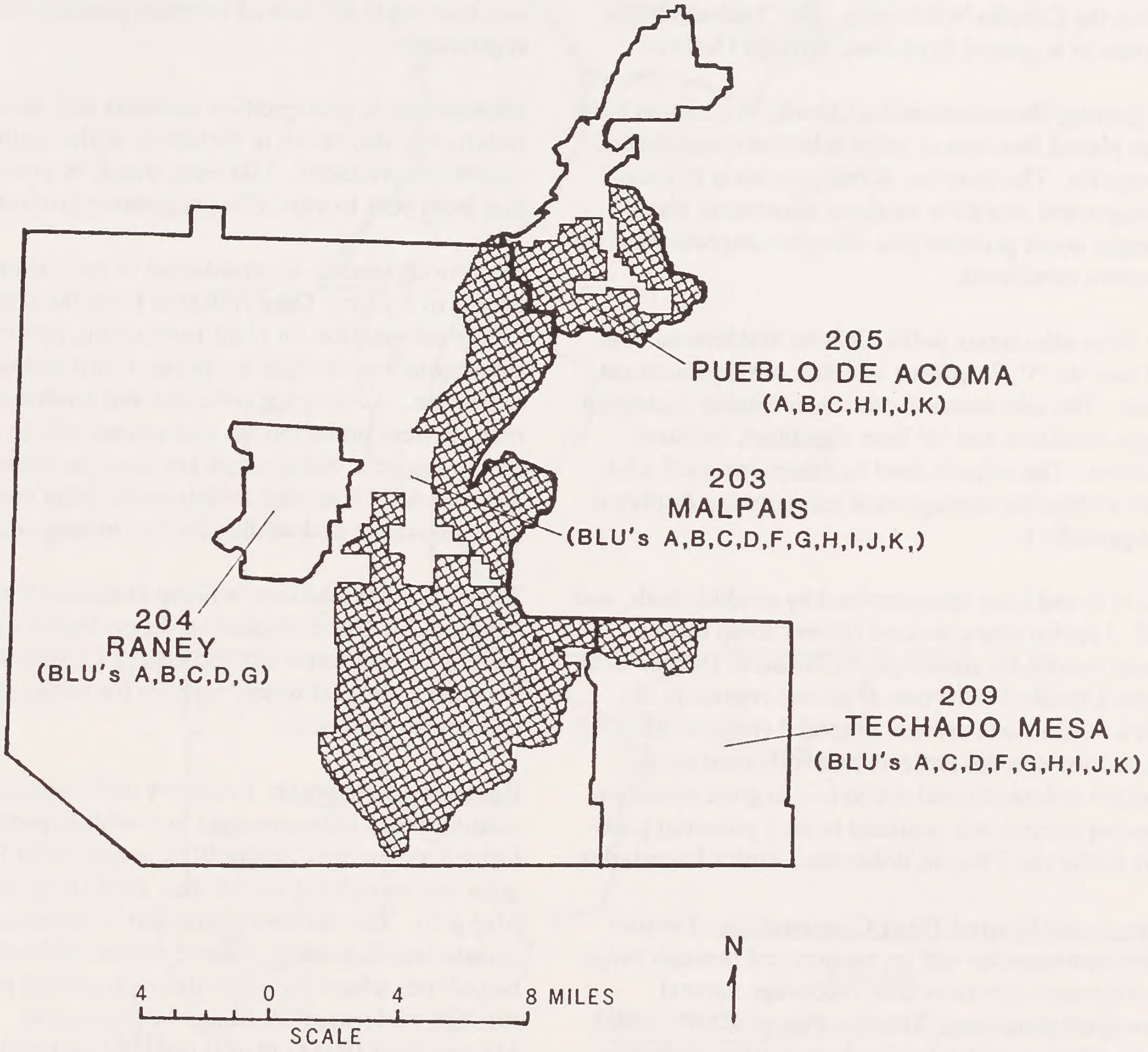
Allotment Number	Allotment Name	No. of Pastures	Preference Total (AUMs)
0203	Malpais	15	14,116
0205	Los Pilares	2	2,352
0209	Techado Mesa	6	5,304

TABLE 4-7
ECOLOGICAL AND VEGETATIVE INFORMATION FOR ALLOTMENTS OVERLAPPING THE CEBOLLA WILDERNESS UNIT

Allotment	BLU	Acres/%		Potential Plant Community	Existing Plant Community	Management Category
203	A	8804	9.6%	grass shrub/grass forb/mix conifer	grass shrub	I
	B	1574	1.7%	grass shrub/pinon juniper increasing to rabbitbrush	sparse bare/grass shrub	
	C	3212	3.5%	mix conifer/grass shrub	shrub conifer	
	D	123	0.1%	ponderosa parkland/ponderosa Douglas fir/pinon juniper/shrub oak	shrub conifer	
	F	17	0.02%		lava, lichen	
	G	447	0.5%	ponderosa parkland/ponderosa Douglas fir/pinon juniper shrub/oak shrub	mixed conifer	
	H	3726	4.1%	mix conifer/grass shrub	mixed conifer	
	I	26524	29.0%	pinon juniper/grass shrub/mix conifer	grass shrub/shrub conifer/mixed conifer	
	J	3440	3.8%	ponderosa Douglas fir/oak shrub	grass shrub/shrub conifer/mixed conifer	
	K	2046	2.2%		ponderosa/deciduous	

TABLE 4-7 -- CONCLUDED

Allotment	BLU	Acres	%	Potential Plant Community	Existing Plant Community	Management Category
205	A	1307	9.8%	grass shrub/grass forb/mix conifer	grass shrub	I
	B	227	1.7%	grass shrub/pinon juniper	sparse bare/grass shrub	
	C	420	3.1%	mix conifer/grass shrub	shrub conifer	
	H	348	2.6%	mix conifer/grass shrub	mixed conifer	
	I	6037	45.0%	pinon juniper/grass shrub/ponderosa oak/pinon	grass shrub/shrub conifer/mixed conifer	
	J	600	4.5%	ponderosa Douglas fir/oak shrub	grass shrub/shrub conifer/mixed conifer	
	K	561	4.2%		ponderosa/deciduous	
209	A	166	0.9%	grass shrub/grass forb/mix conifer	grass shrub	I
	C	136	0.8%	grass shrub/mix conifer	shrub conifer	
	D	225	1.3%	ponderosa parkland/ponderosa Douglas fir/oak shrub/pinon juniper shrub	shrub conifer	
	F	5	0.03%		lava/lichen	
	G	341	1.9%	ponderosa parkland/ponderosa Douglas fir/oak shrub/pinon juniper shrub	mixed conifer	
	H	652	3.7%	mix conifer/grass shrub	mixed conifer	
	I	897	5.0%	pinon juniper/grass shrub/ponderosa oak/pinon	grass shrub/shrub conifer/mixed conifer	
	J	331	1.9%	ponderosa Douglas fir/oak shrub	grass shrub/shrub conifer/mixed conifer	
	K	195	1.1%		ponderosa/deciduous	



MAP 4-4
GRAZING ALLOTMENTS OVERLAPPING THE CEBOLLA WILDERNESS UNIT
IN RELATIONSHIP TO BIOPHYSICAL LAND UNITS

The Malpais Allotment (previously the York Ranch Allotment) covers most of the Cebolla Wilderness Unit (refer to Table 4-6). This allotment and the Los Pilares Allotment (previously the Pueblo de Acoma Allotment) support yearlong operations that require supplemental feeding during certain months and special maintenance of water facilities. All supplemental feeding occurs on privately owned inholdings within the Cebolla Wilderness. The Techado Mesa Allotment is grazed from June through October.

All grazing allotments in the Cebolla Wilderness have been placed into one of three selective management categories. The purpose of this process is to focus management attention on those allotments where changes could produce cost-effective improvement in resource conditions.

All three allotments in the Cebolla Wilderness Unit fall into the "I" (Improve) selective management category. The allotments are in unacceptable ecological range condition and/or have significant resource conflicts. The criteria used to determine each allotment's selective management category are displayed in Appendix I.

BLUs B and I are characterized by erodible soils, and BLU I is also characterized by very steep terrain. These two BLUs constitute 35,341 acres (50 percent) of the Cebolla Wilderness Unit and represent the unit's most severe erosion potential (refer to Map A). Six erosion control projects presently exist on the Malpais Allotment and are in fair to good condition. Erosion control will continue to be a potential problem within the Cebolla Wilderness Unit's boundaries.

Forage and Desired Plant Communities: Desired plant communities will be encouraged through range management practices that encourage natural ecological processes. The Rio Puerco RMP (USDI, BLM 1986) provides for implementation of changes in management techniques and/or reductions in allowable livestock grazing use on "I" category allotments. These measures could ensure improvement in ecological range condition, thus obtaining desired plant communities that provide forage needs for livestock grazing use and wildlife habitat, and improvement in watershed conditions. Improving the quality and quantity of forage is a recognized focus of livestock grazing management. Such improvement results from managing for a desired community of plant species and for species productivity.

Management techniques in the Cebolla Wilderness vary among allottees, and each allotment is likely to reflect a different combination of management practices that affect forage quality and quantity. Practices such as the amount of time and season that the range is grazed each year, the number of cattle grazed, feeding methods, the number of waters and their locations, the number of pastures in an allotment, and how cattle are moved between pastures all affect vegetation.

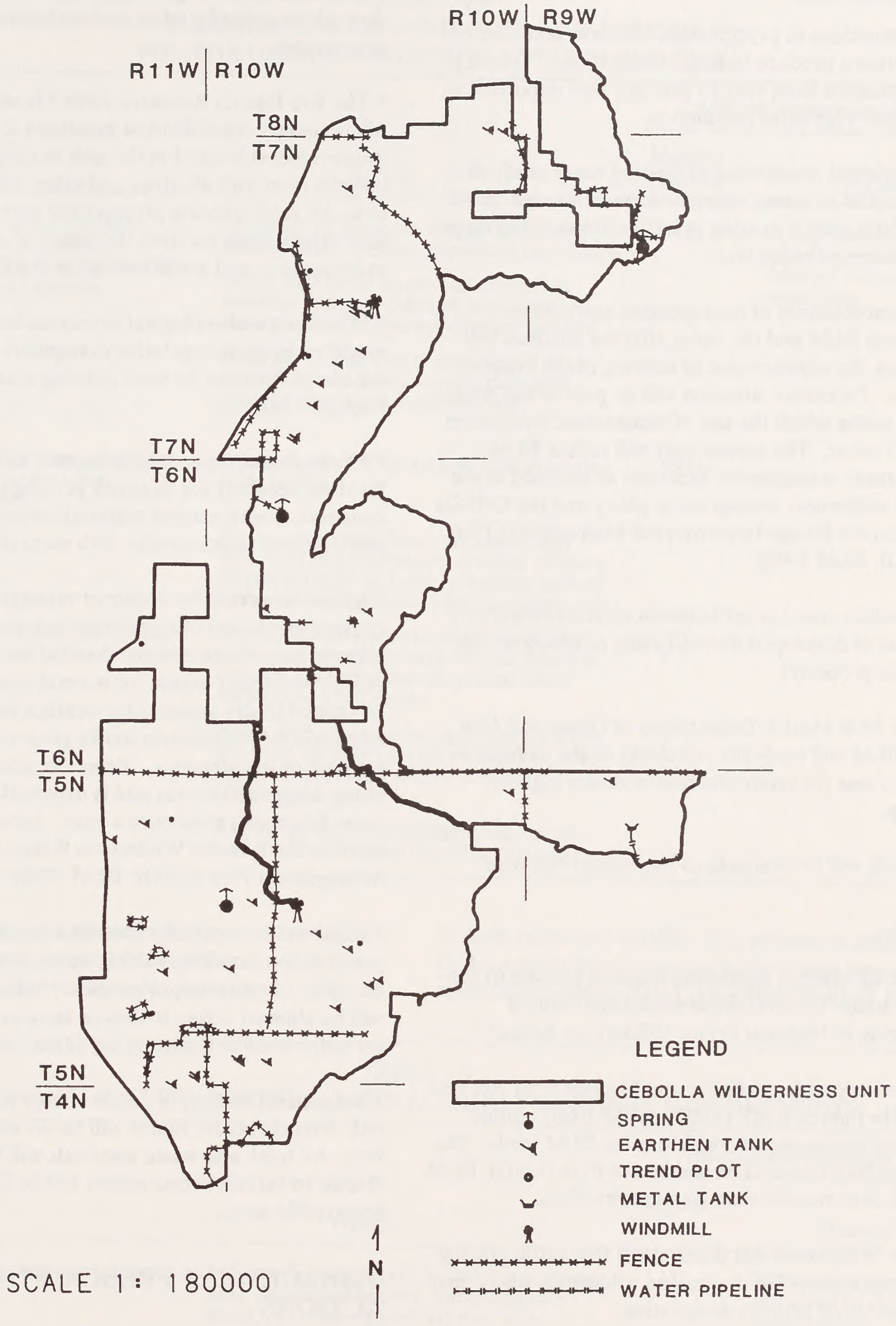
Fluctuations in precipitation amounts and time of occurrence also result in variations in the amount of vegetation produced. Likewise, trends in precipitation from year to year affect vegetative production.

Monitoring studies are conducted in each allotment every 1 to 5 years. Data collected from the studies supply information on plant production, cover, density, frequency, changes in species composition, and utilization. As data are collected and analyzed, management prescriptions and actions will be added as appropriate. Selection of key areas in allotment pastures will be needed to determine plant communities for range and wildlife habitat management.

The Cebolla Wilderness is being evaluated for its potential for reintroduction of desert bighorn sheep, since it is considered historic range. Competition between cattle and desert bighorn for forage, water, and cover could occur.

Range Improvements: Inventory and inspection of existing range improvements and wildlife projects located within the Cebolla Wilderness Unit's boundaries was completed in October, 1988 (refer to Map 4-5). This inventory included improvements on private land inholdings located within wilderness boundaries where access to these properties is through wilderness. A Range Improvement Management (RIM) Plan (USDI, BLM 1990) has been completed for the three allotments using the inventory information, and recommendations have been included in the proposed prescriptions and actions for this section of the GMP.

No undeveloped surface waters are known to exist in the Cebolla Wilderness. Developed waters are located on private lands within wilderness boundaries. Most are developed for livestock, but serve an important second role as wildlife waters. A list of waters is contained in the Cebolla Wilderness RIM Plan. No new waters are planned.



MAP 4-5
RANGE IMPROVEMENTS IN THE CEBOLLA WLDERNESS UNIT

Assumptions

* Fluctuations in precipitation amounts and time of occurrence produce biomass fluctuations. Trends in precipitation from year to year are also important to trends in vegetative production.

* Continued monitoring of existing range study sites is essential to assess vegetation condition and trend, and determine if grazing practices are meeting range improvement objectives.

* A renegotiation of management agreements between BLM and the three affected allottees will address the maintenance of existing range improvements. Particular attention will be paid to the conditions under which the use of mechanized equipment would occur. The agreements will reflect BLM wilderness management practices as outlined in the BLM wilderness management policy and the Cebolla Wilderness Range Improvement Management Plan (USDI, BLM 1990).

* Conflicts could occur between recreators and protection of developed waters (many of which are on private property).

* The New Mexico Department of Game and Fish and BLM will study the suitability of the Cebolla Wilderness for reintroduction of desert bighorn sheep.

* Funds will be available to implement this plan.

Policy

* The El Malpais legislation requires grazing to continue under Congressional guidelines entitled "Grazing in National Forest Wilderness Areas."

* The Federal Land Policy and Management Act and the Rio Puerco RMP (USDI, BLM 1986) outline grazing management conditions for BLM lands. The Range Improvement Management Plan (USDI, BLM 1990) cites specific management practices.

* The Wilderness Act determined that cattle grazing will continue within designated wilderness where that use occurred prior to designation.

* The selective management category for any "I" category allotment will be changed as ecological conditions improve and resource conflicts are resolved, as documented by monitoring.

* Any adjustment to grazing levels will be considered through rangeland studies and environmental assessments.

* The Rio Puerco Resource Area Manager will identify necessary rehabilitation measures for range improvements located in the unit in cooperation and coordination with allottees and other interested parties. All rehabilitation projects will protect wilderness values while meeting the needs of range management, and are identified in the RIM plans.

* Where natural ecological processes have been modified by man, vegetative manipulation (including the use of fire) can be used to bring natural processes back into balance.

* Replacement range improvements will be evaluated for their necessity for livestock grazing operations, constructed with natural materials where possible, and designed to harmonize with natural features.

* Vehicular access for repair or maintenance of range improvements including existing waters will be allowed only where non-mechanical means are not viable. Vehicular access for normal maintenance will be limited to dry ground/dry weather conditions. BLM will be notified two weeks prior to entry for the purpose of maintenance. Vehicular access will be along designated routes and is expected to occur no more frequently than once a year. Access routes are listed in the Cebolla Wilderness Range Improvement Management Plan (USDI, BLM 1990).

* BLM will be notified within 48 hours of any emergency action requiring vehicle access for maintenance or repair of range improvements. Vehicular access will be allowed across frozen or snow covered ground for unforeseen and emergency situations.

* No general blading of access routes will be permitted. Vehicle access routes will be no wider than 15 feet. All trash and waste materials will be removed. Repair to vehicle access routes will be limited to impassable areas.

MANAGEMENT PRESCRIPTIONS AND ACTIONS

The following prescriptions and actions are proposed to encourage the forage and desired plant community through natural ecological processes.

TABLE 4-8
MANAGEMENT PRESCRIPTIONS AND ACTIONS
FOR FORAGE AND DESIRED PLANT COMMUNITIES

Management Prescription	Action	Affected Environment: Natural (BLUs)	Affected Environment: Human
Protect the range resource, enhance forage, increase cover, density, & frequency of desired forage species	Maintain or improve forage while protecting plant species important to wildlife Select key areas in each allotment to monitor range condition; use Limits of Acceptable Change monitoring system Institute changes in management practices if or when monitoring indicates desired range condition decline	All	Range management practices partly control forage condition
Protect against damaging fire where fuels or problem species threaten	Allow fire to fill its natural role deterring fuels buildup	CGH	
	Encourage small fires (no more than 20 acres) in areas where erosion of steep slopes is likely and where human activity has produced potential for damaging fire	I	
Protect against soil loss from erosion	Encourage allottees to enter into cooperative agreements with SCS to develop erosion control plans on private lands within unit boundaries Enter into cooperative agreements with allottees on appropriate changes in management practices where erosion problems occur Repair or replace existing erosion control structures when found in disrepair	BI	

The following prescriptions and actions are proposed to manage range improvement within the Cebolla Wilderness. This includes developed waters utilized by both cattle and wildlife. The primary management tool for range improvements is the Range Improvement Management (RIM) Plan (USDI, BLM 1990).

TABLE 4-9
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR RANGE IMPROVEMENTS

Management Prescription	Action	Affected Environment: Natural (BLUs)	Affected Environment: Human
Protect range improvements and livestock	Inform visitors of policies about camping near developed waters, harassing livestock, or otherwise interfering with grazing use	All	Recreators are attracted to developed waters
	Inform visitors of potential impacts that can occur when they alter fences, gates, water tanks, or windmills	All	Potential conflicts between recreation use and range management

WILDLIFE HABITAT

Management Objectives for Wildlife Habitat

CONSERVE DIVERSE WILDLIFE HABITAT TYPES IN THEIR NATURAL CONDITION WHILE PROVIDING VISITOR USE AND ACCESS, AND TO ALLOW NATURAL ECOLOGICAL SUCCESSION OF BIOLOGICAL POPULATIONS.

Current Situation

General Information: The Cebolla Wilderness Unit is characterized by a varied pattern of diverse vegetation, very broken and steep terrain, and erodible soils. These habitat components are dispersed in a patchwork pattern that provides the Cebolla Wilderness Unit's wildlife with a variety of habitat types (refer to Table 1-4, Chapter 1). Large areas of edge where one habitat grades into another add to the habitat complexity and increase wildlife species diversity. The complexity of habitats is reflected by the BLUs in the Cebolla Wilderness Unit (refer to Map A). Appendix G lists species found in the BLUs of the unit, some of which are deer, elk, bear, cougar, and raptors. Appendix G also includes habitat features important to each species.

The Cebolla Wilderness Unit offers potential habitat to a variety of special status species (refer to Appendix H for a list of such species). The steep cliffs of the unit offer nest sites for many raptors, including potential sites for the peregrine falcon, a species on the federal endangered list which makes casual use of the area. The prairie dog towns in BLU A have been surveyed for the endangered black-footed ferret, but no verified sighting has been made. Surveys are ongoing. The New Mexico Department of Game and Fish (NMDG&F) and the BLM are considering reintroducing desert bighorn sheep into the Cebolla Wilderness, where they historically existed. Studies will consider cover, available water, and the overall health of the herd being considered for introduction.

Nine wildlife seeding exclosures are located in the Malpais (formerly York Ranch) Allotment. All are in good condition, and provide a protected, high-quality habitat for wildlife. No plans exist to remove these exclosures from the wilderness unit boundaries so long as grazing continues.

Eight wells and five developed springs are located on private land within wilderness boundaries. These wells and springs offer the main water supply for wildlife in the unit. Two of the springs were developed primarily to benefit wildlife but both have failed. It is important for wildlife habitat that the existing range management waters continue to be maintained, because wildlife also benefit from their presence.

Special Use Areas: Certain habitat types in the Cebolla Wilderness are especially important to wildlife because they are in limited supply, provide essential combinations of habitat factors during critical portions of a life cycle, or allow protected access to preferred habitats during seasonal migrations.

Two springs located on private land have potentially significant riparian habitat. Management of springs for the maintenance or improvement of riparian habitat may be pursued with the landowners through cooperative agreements. Lands containing springs have been identified for acquisition in the BLM Land Protection Plan (refer to Appendix B for a summary).

Species Management: The El Malpais legislation allows hunting and trapping to continue in the Cebolla Wilderness Unit. Federal regulations protect migratory birds and raptors; federal and state regulations protect special status species; and New Mexico Department of Game and Fish regulations control hunting seasons, numbers, and species of game taken.

The BLM conducts a public information and outreach program called "Operation Respect" within the Cebolla Wilderness annually during hunting season. This program is oriented toward assuring a positive and safe hunting experience for the recreator, and minimizing potential impacts to private and public lands and natural resources.

Assumptions

* Wildlife viewing will increase as a popular recreation activity.

* The erodible soils on the steep slopes throughout BLU I and in the drainages of BLU B (refer to Map A) make erosion control and maintenance of vegetative cover important components of habitat management in the Cebolla Wilderness Unit.

* Existing developed waters are critical to support existing wildlife populations.

* Interest in hunting and trapping within Cebolla Wilderness will continue.

* Specific monitoring needs for determining the condition of habitats will be established.

* Funds will be available to implement this plan.

Policy

* BLM has a broad interest in protecting the habitat of all wildlife as part of its overall multiple use program outlined in Fish and Wildlife 2000, a BLM planning document designed to guide wildlife management into the year 2000 (USDI, BLM 1990).

* Natural ecological processes will be allowed to occur in the wilderness without human influence as much as possible.

* Specific monitoring needed for determining condition of habitats will be established as part of the Limits of Acceptable Change (LAC) monitoring system (refer to Appendix J).

* Wildlife developments will be maintained with the minimum tool necessary to accomplish the task.

* The El Malpais legislation mandates resource conservation in the NCA. BLM policy specifies responsibilities to provide food and habitat for wildlife in a variety of ways for a variety of habitat types.

* The Federal Land Policy and Management Act (FLPMA) and the Rio Puerco Resource Management Plan (RMP) outline range and wildlife management policies for the El Malpais NCA.

* BLM wilderness management policy limits vegetative manipulation to those actions necessary to restore natural ecological processes affected by human interference.

* The New Mexico Department of Game and Fish (NMDG&F) Operations Plan (1987-1995) suggests habitat management for certain species that occur in the Cebolla Wilderness Unit.

* The BLM Range Improvement Management Plan (USDI, BLM 1989) cites specific management policies for waters in the Cebolla Wilderness Unit.

* NMDG&F manages hunting seasons for mule deer, black bear, squirrel, and turkey. Wilderness policy requires that hunts occur on foot or from horseback.

* All studying and monitoring of wildlife and their habitats will be accomplished by non-motorized and non-mechanical means.

* The preservation of sensitive or special status species habitat dependent on wilderness conditions will be favored.

Management Prescriptions and Actions for Wildlife Habitat Management

The following prescriptions and actions are proposed to protect wildlife special use areas in limited supply.

TABLE 4-10
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR SPECIAL USE AREAS

		Affected Environment	
Management Prescription	Action	Natural (BLUs)	Human
Prevent human impacts to areas occupied by wildlife for breeding, birthing, migration, cover, & winter use	Survey to identify these areas before conflicts occur between humans & wildlife Design management strategies to deter conflicts before they occur	All	Consider sensitive areas when creating trails; redirection of recreators may be necessary
Prevent human impacts to wildlife during sensitive times of their life cycles (birthing, breeding, migration, winter use)	Survey to determine sensitive times & locations for such activities before conflicts occur between humans & wildlife	All	

TABLE 4-10 -- CONCLUDED

Management Prescription	Action	Affected Environment: Natural (BLUs)	Affected Environment: Human
Protect against loss of habitat through erosion	Hand seed native or endemic species onto slopes identified as sensitive where soil loss threatens & human influence is responsible	I	
	Encourage growth of cover species in drainages	B	
Protect all drainages, wetlands, & playas	Manage these areas as sensitive habitat	ABE	Potential conflicts between habitat management & range management
	Establish cooperative agreements w/allottees to limit cattle access		
	Acquire private lands w/in NCA boundaries that contain these resources		
Protect identifiable special use sites	Deter destruction of identifiable special use sites such as raptor aeries, snake dens, mammal burrows, wildlife trees, down rotting logs, prairie dog towns	All	May need to educate allottees & recreators about special use sites
	Survey to determine old growth areas that may be managed for southern spotted owls	GHIJ	
Protect the patchwork pattern of habitats and natural evaluation of habitats	Develop a fire plan that allows fire to fill its natural role		

The following prescriptions and actions are proposed to protect all wildlife in the Cebolla Wilderness and to manage populations of species regulated by the NMDG&F.

TABLE 4-11
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR REGULATED SPECIES MANAGEMENT

Management Prescription	Action	Affected Environment: Natural (BLUs)	Affected Environment: Human
Manage populations of species regulated by the NMDG&F	Continue to provide input to NMDG&F regarding hunting & trapping in the NCA.	All	Hunting attracts many visitors to the area each year; deer, bear, antelope, turkey, dove, & Abert's squirrel are hunted
	Manage forage & browse condition to support specified population sizes of species regulated by NMDG&F as stated in Operations Plan (1987-1990)		
Protect all wildlife	Provide visible presence in area by patrolling borders of unit to deter poaching & other unlawful taking	AC	
	Continue "Operation Respect"	All	
	Maintain existing livestock & wildlife waters		

TABLE 4-11 -- CONCLUDED

		Affected Environment	
Management Prescription	Action	Natural (BLUs)	Human
Protect habitat of songbirds, insectivorous birds, raptors, & threatened & endangered species	Provide educational material to the public about these resources	All	Visitors are attracted to areas offering diversity of wildlife
Consider the feasibility of reintroducing bighorn sheep into Cebolla Wilderness Unit			
	Establish a cooperative agreement w/NMDG&F	I	Reintroduced species may compete w/livestock for some resources
	Negotiate necessary range management changes w/allottees		
Protect hole nesting wildlife	Deter the cutting of dead standing trees	CIJ	

SCIENTIFIC STUDY

Management Objective for Scientific Study

ALLOW RESEARCH TO OCCUR AS LONG AS IT IS CONDUCTED IN SUCH A MANNER TO PROTECT AND PRESERVE THE WILDERNESS CHARACTER IN ITS NATURAL CONDITION SUBJECT TO NATURAL ECOLOGICAL PROCESSES.

Current Situation

Research and Data Collection: The Cebolla wilderness contains opportunities for scientific study and data gathering in an outdoor laboratory setting for those projects requiring a dynamic natural environment. Range conservationists and wildlife biologists are presently monitoring vegetation conditions. Nine wildlife seeding exclosures are being monitored.

Significant cultural resources exist within the Cebolla Wilderness, and were highlighted in the El Malpais legislation. Some excavation and stabilization occurred prior to wilderness designation. No additional applications for such activities have been received. Refer to the cultural resource section below for details specific to that resource.

Assumptions

* Permit applications for scientific study in the Cebolla Wilderness may be received, particularly for cultural resource investigations.

* Implementing the concept of a Field Learning Center will facilitate scientific study objectives. (Refer to Chapter 3, Recreation section, for a discussion of the Mertz Ranch Site, and to Chapter 9, Interpretation and Education.) This could provide data that would help assure that the Cebolla Wilderness retains its natural character, subject to natural processes.

* The demand for basic research in the wilderness may increase due to the unique research opportunities provided by a legislatively protected area where the functioning of natural ecological processes is emphasized. This may include biological, cultural, and/or social research.

* Funds will be available to implement this plan.

Policy

* Scientific study involving extraction of materials or surface-disturbing activities (e.g., excavation, surface collection, stabilization) will be analyzed on a case-by-case basis.

* Scientific study involving non-consumptive/non-extractive data collection will be monitored closely to achieve conformance with the objective stated above.

* All projects must be conducted without the use of motorized vehicles, mechanized equipment, or facili

ties unless expressly authorized when no other reasonable alternative exists. If such use is approved, it must be the minimum necessary and must not degrade the wilderness resource.

* All requests for scientific study and data collection will be analyzed in an environmental assessment. All proposals for scientific study will:

- provide information on specific location (with maps), timeframes, detailed description of proposed action and a reclamation plan. Locality information will be kept confidential when possible.
- provide for detailed recordation, reports, care of specimens, and availability of information to the public, specialists, scientists, and institutions.
- address similar information or material available for study in existing collections.

* Authorized material collection of wilderness resources must be conducted in an inconspicuous manner and not be visually evident to the casual observer.

* Permanent or temporary study plots or structures must be inconspicuous and not be visually evident to the casual observer.

* Provide administrative aid (staff time and funding) when possible and process requests for projects within 120 days of receipt.

Management Prescriptions and Actions

The following prescriptions and actions are proposed to maintain and monitor existing studies and to encourage research and data collection when they facilitate wilderness goals and objectives.

TABLE 4-12
MANAGEMENT PRESCRIPTIONS AND ACTIONS
FOR SCIENTIFIC RESEARCH AND DATA COLLECTION

		Affected Environment	
Management Prescription	Action	Natural (BLUs)	Human
Continue range and wildlife habitat studies in Cebolla Wilderness	Maintain and monitor existing study plots	ABCIK	BLM resource specialists will continue to gather resource information
	Evaluate study plots for conformance to requirement of not being visually evident to the casual observer		
	Modify design if VRM Class I standards are not met		
Encourage scientific research in the Cebolla Wilderness when it facilitates wilderness goals & objectives	Develop cooperative agreements w/teaching & research institutes to conduct studies		Data collection & analysis can expand understanding of natural & human systems
	Develop an efficient & responsive permitting system for research proposals in Cebolla Wilderness		
	Encourage establishment of a Field Learning Center (refer to Chapter 3 & Chapter 9)		
	Divert research not dependent on the wilderness setting to other portions of the Conservation Area, or outside of the NCA		
	Develop agreements w/ research institutes to conduct studies on social, biological, geomorphic, and geologic processes which aid in identifying & mitigating human-caused changes		

CULTURAL RESOURCES

Management Objectives for Cultural Resources

CULTURAL RESOURCES WILL BE MANAGED WITH AN EMPHASIS ON FUTURE SCIENTIFIC USE AND, TO LESSER EXTENT, MANAGED FOR FUTURE AND CURRENT PUBLIC USE. CULTURAL RESOURCES WILL BE MANAGED TO CONSERVE THEM IN A STABLE CONDITION FOR FUTURE USE FOR AS LONG AS POSSIBLE.

Current Situation

General Information: The Cebolla Wilderness Unit contains a majority of the cultural resources in the NCA. Presently about 2.6% of this unit has been inventoried intensively for cultural resources and 158 archeological sites have been recorded.

Cultural resources in the Cebolla Wilderness Unit range from Early Archaic lithic scatters (about 7,000 years ago) to historic homesteads and sawmills. Most common are small pueblos dating from Pueblo II through Pueblo III times (about 1,000 years ago). The unit includes at least one prehistoric community with a Chacoan building, great kiva, and prehistoric road (the Dittert Site), and two large fortified late Pueblo III aggregated villages (the Citadel and the Pinole Site). Petroglyphs and pictographs dating to Anasazi times (400 to 1,300 years ago) also occur within the unit. Among the historic resources are several very well-preserved homesteads.

Presently only one archeological site in the Cebolla Wilderness Unit, Dittert Site, is listed on the National Register of Historic Places. This site was partially excavated by Alfred Dittert in the late 1940's and was stabilized by the Bureau of Land Management in 1976. Other active cultural resource management in the Cebolla Wilderness Unit by the BLM has included an extensive reconnaissance conducted by Regge Wiseman in 1976 and backfilling potholes at the Citadel Site (also known as the Promontory Site) in 1978. In that same year stabilization assessments were prepared for the Pinole Site and the Narrows Site. Most recently the BLM contracted in 1989 for a major archeological survey that included portions of the Cebolla Wilderness.

The 1989 archeological survey provides systematic information about the condition of archeological resources. These data indicate that erosion and vandalism are the most serious threats to both public use and potential scientific use of cultural resources in the Cebolla Wilderness Unit.

Vandalism and Surface Collection: The 1989 archeological survey suggests that 15% of all vulnerable sites in the Cebolla Wilderness Unit show signs of vandalism or illegal surface collection. Vandalism includes pothunting, theft of artifacts or building materials, and deliberate defacement or destruction of cultural properties. These activities seem to occur at relatively wide intervals, but their effects are irreversible and they affect cultural resources selectively. The largest and most important resources are often the most seriously damaged by these activities. Collection of surface artifacts is also included in this element since many of the same management prescriptions apply. Collection of surface artifacts can seriously reduce the potential for scientific investigation.

Natural Deterioration: An estimated 83% of all archeological sites in the Cebolla Wilderness Unit suffer some degree of soil erosion. For at least 15% of these, the damage is judged to be serious. Erosion primarily threatens scientific potential. Actual impacts range from sheet erosion which gradually exposes artifacts and destroys their context, to massive gullying which can completely obliterate an archeological site in a short time. Other sources of natural deterioration affect historic homesteads, which are constructed of flammable materials and materials which are subject to natural decay.

BLM Authorized Actions: BLM actions and actions authorized by the BLM can have important effects on cultural resources, and it is critical that the BLM carefully consider these effects, particularly because of the special mandate to protect archeological and historical values in El Malpais. Because of this mandate, the management prescriptions under this element reflect a more careful, conservative approach than usually applies on multiple use lands. Although these prescriptions place restrictions on some forms of research, investigations which do not involve excavation or collection and those which focus upon threatened properties should be actively encouraged.

Public Information and Education: Public information and education are another element which is considered in the GMP. An important aim of the public education initiatives in this document is development of a positive land ethic, particularly with regard to cultural resources. Actions proposed under this issue category range from interpretation of specific properties to more general actions such as preparation of brochures or exhibits. This theme is further elaborated upon and reinforced in Chapter 9, a summary of the interpretation and education prescriptions and actions for the NCA. Of particular interest is the concept of a Field Learning Center to serve not only interpretation and education needs, but also scientific research needs.

Assumptions

* Most sites will be managed to preserve their potential for scientific investigation.

* The Dittert Site, the Pinole Site, the Citadel Site, the rock art sites, and selected homestead sites will be managed to preserve their potential for public interpretation.

* The Dittert Site will be developed for public interpretation, using offsite media.

* The principal threats to cultural resources within the Cebolla Wilderness Unit are vandalism, surface collection, erosion and natural deterioration, and federally authorized actions.

Policy

* One principal objective of the El Malpais legislation is to protect archeological resources, with special attention to enforcement of the Archeological Resources Protection Act (ARPA) and the National Historic Preservation Act.

* The El Malpais legislation also mandates a continuing program of public education and interpretation about the resources of the NCA, including cultural resources.

* Wilderness areas will be managed so as to preserve their overall wilderness character.

Cultural resource authorizations within wilderness will be allowed, if they are carried out in a manner that will not degrade wilderness values, or on a case-by-case basis with the BLM State Director's approval.

* Wilderness designation does not relieve the BLM of its affirmative cultural resource management responsibilities. However, it is recognized that the manner in which cultural resources will be managed is different within wilderness areas in that approved actions also may not adversely affect the overall wilderness character.

* All approved actions within wilderness areas are still subject to normal Section 106 clearance procedures, in accordance with the National Historic Preservation Act.

* Administration of these policies is presented in more detail in the New Mexico Manual Supplement (Manual 8110/8560), "Cultural Resource Management Within Designated Wilderness Areas," and in Chapter 13 of this GMP.

Management Prescriptions and Actions

The following prescriptions and actions are proposed to minimize the occurrence of vandalism and surface collection.

TABLE 4-13
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR VANDALISM AND SURFACE COLLECTION

		Affected Environment	
Management Prescription	Action	Natural (BLUs)	Human
Aggressively enforce ARPA by enhancing the probability of catching & successfully prosecuting violators	Establish & publicize rewards for information leading to arrest & conviction of ARPA violators	All	Increasingly, ARPA violators are professional criminals who loot sites for profit
	Ensure ARPA training for law enforcement & other key field personnel	All	ARPA enforcement requires specialized training

TABLE 4-13 -- CONCLUDED

Management Prescription	Action	Affected Environment: Natural (BLUs)	Affected Environment: Human
Discourage vandalism & illegal surface collection	Post antiquities signs in areas of active vandalism, such as Cebolla Canyon Complex & Pinole Site	ABI	Place signs so as not to attract vandals to undisturbed sites
	Consolidate ownership of critical properties (e.g., Pinole Site, Cebolla Canyon Complex) to clarify land ownership	ABI	Looters claim their activities are on private land
	Increase BLM visibility in CWU, especially during increased visitor use & in sensitive areas (e.g., NM 117 Corridor)	ABI	General correlation assumed between visitor use & casual excavation/surface collection
Identify sites & areas vulnerable to & affected by vandalism & surface collection	Increase level of Class II inventory to 5% of unit (1,508 acres of new Class III survey)	All	Patterns of vandals' activities should be understood
	Complete Class III inventory of Cebolla Canyon complex (320 acres + additional acreage in Conservation Unit), Tank Canyon area (640 acres), Dittert Site area (640 acres), & other key areas identified through Class II inventory	ABI	Baseline information needed to support ARPA prosecution
	Through aerial photo interpretation, review of existing records, & reconnaissance, record & photodocument all homesteads & rock art sites in unit	ABI	Baseline information needed to support ARPA prosecution
Closely monitor sites & areas most vulnerable to vandalism & surface collection, to recognize & stop developing problems early	Establish annual photomonitoring for Dittert Site, Pinole Site, Citadel (or Promontory) site, two rock art sites, & other key vulnerable sites	ABI	Baseline information needed to support ARPA prosecution
	Establish & implement formal program to systematically revisit recorded sites to gather information about changes in condition	ABI	Patterns of vandals' activities should be understood
	Acquire easements into lower Cebolla Canyon, Homestead Canyon, & Dittert Site to ensure legal access for monitoring & law enforcement	ABCI	Federal access into these important areas could be blocked at any time
	Prepare damage assessments for incidents of recent vandalism	ABC	Need to quantify amount of damage done by vandals
	Initiate long-term study using detailed surface documentation to record effects of surface collection (perhaps w/ sites near Dittert Site)	ABI	Nature, degree, rate of deterioration caused by casual artifact collection by visitors not well known

The following prescriptions and actions are proposed to minimize the damage from soil erosion now impacting 83% of the cultural resources within the Cebolla Wilderness Unit.

TABLE 4-14
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR NATURAL DETERIORATION

Management Prescription	Action	Affected Environment	
		Natural (BLUs)	Human
Identify sites & areas vulnerable to & affected by natural deterioration	Increase level of Class II inventory to 5% of unit (1,508 acres of new Class III survey), emphasizing information about site condition	All	Important scientific & perhaps interpretive values being lost without BLM knowledge
	Through aerial photo interpretation, review of existing records, oral history, & reconnaissance, record & photodocument all homesteads & rock art sites within the unit	ABCI	Potential interpretive properties should be identified & factors affecting their condition evaluated
Closely monitor sites & areas most vulnerable to & affected by natural deterioration to recognize & stop mitigate problems early	Establish annual photomonitoring for Pinole Site, Dittert Site, Citadel Site, Site 407, rock art sites, well-preserved homesteads, & other vulnerable sites w/ potential for public interpretation or high scientific value	ABI	Condition of important scientific & interpretive sites should be closely monitored
	Establish & implement program to systematically revisit recorded sites threatened by natural deterioration to update information about changes in condition	ABCI	Scientifically important resources being lost through natural erosion
Preserve important scientific values & sites w/ potential for public interpretation through physical protection measures when values may be lost	Maintain existing stabilization at Dittert Site	AB	Interpretive values could be lost through site neglect
	Develop erosion control plan for unit, emphasizing preservation of cultural resources	ABI	Important scientific & interpretive values being lost
	Undertake new stabilization, backfilling, & repairs at Pinole Site & historic homesteads	ABCI	Important interpretive values lost if measures not taken
	Through training or detail assignments, develop staff expertise in repair & preservation of historic homesteads & related features	ABCI	Specialized knowledge & skills required
	Establish & stake high-priority fire suppression zones to protect high-value homesteads that include flammable elements	ABCI	Properties w/ public interpretation potential could be lost

The following prescriptions and actions are proposed to assure BLM considers the potential effects on cultural resources of all BLM-authorized actions.

The lower prescriptions and actions are proposed to develop a positive land ethic, in regard to cultural resources.

TABLE 4-15
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR BLM AUTHORIZED ACTIONS

Management Prescription	Action	Affected Environment Natural (BLUs)	 Human
Preserve long-term potential of sites for scientific use	Restrict research involving collection or excavation at non-threatened sites	ABI	Research can destroy or diminish research potential
	Favor avoidance over mitigation when contemplating development and use-related impacts on cultural resources	All	
	Inventory at least 1/4-mile radius around proposed visitor-use developments such as trailheads, considering potential secondary impacts	ABI	Cumulative impacts of casual collection by visitors can severely damage cultural resources
Reduce need for research involving collection or excavation by encouraging use of existing collections	Locate existing collections from previous research & compile copies of project records	ABI	
Emphasize importance of key cultural resources	Nominate Cebolla Canyon Complex, Pinole Site, Dittert Site community, & selected homestead sites to National Register of Historic Places	ABI	National Register listing will enhance public perceptions of properties' importance

TABLE 4-16
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR PUBLIC INFORMATION AND EDUCATION

Management Prescription	Action	Affected Environment Natural (BLUs)	 Human
Maintain continuing program of interpretation & public education about cultural resources in NCA (refer to Chapter 9).	Present cultural resources in exhibits in Multiagency Center & Ranger Station		
	Incorporate cultural resources into environmental education programs given at schools		
	Prepare site bulletin (brochure) about cultural resources of NCA		
	Identify cultural resources w/public interpretation potential (e.g., Cebolla Canyon Complex, Pinole Site, rock art sites, & suitable homesteads) & manage them to maintain potential	ABI	
	Develop onsite interpretation at Dittert Site	ABI	

NATIVE AMERICAN ISSUES

Management Objectives for Native American Issues

ENSURE ACCESS FOR TRADITIONAL NATIVE AMERICAN CULTURAL PRACTICES, ENSURE PRIVACY AND RESPECT FOR THOSE PRACTICES, AND FOSTER AN ATMOSPHERE OF COMMUNICATION AND COOPERATION WITH LOCAL NATIVE AMERICAN GROUPS.

Current Situation

Of the four Native American groups known to have used El Malpais, the Acoma are most immediately concerned with the Cebolla Wilderness Unit. The eastern boundary of the unit falls along their reservation boundary, and much of the Acomas' public grazing lease is within the unit.

The numerous Anasazi habitation sites within the Cebolla Wilderness Unit are recognized by Acoma people as ancestral villages. Burials associated with these sites are regarded as the remains of ancestors. It is important to Acoma people that these sites remain undisturbed by human activity.

The Acomas collect plant materials such as herbs, Douglas fir boughs, pinon nuts, and Rocky Mountain beeweed in the unit. Acoma potters also collect sherds from prehistoric pots to be crushed and added to pottery clay as tempering material, a practice dating back at least 1,000 years.

Acoma and Laguna people maintain shrines in the Cebolla Wilderness Unit. Various locations such as high points, water sources, and caves are used as prayer sites. The majority of tribal members may not visit or even know of these places, but they are important to the entire pueblo. Acoma and Laguna pilgrimage routes to important shrines in western New Mexico and eastern Arizona pass thorough or near the unit.

Very little is known about Navajo use of the Cebolla Wilderness Unit. However, the discovery of numerous sweatlodge remains during archeological survey suggests the importance of this unit to the Navajo as well.

In accordance with the wishes of Native American groups, the BLM does not actively manage any sites or areas for traditional Native American uses. Instead the BLM seeks to keep Native American groups informed about major activities proposed in El Malpais, giving them time to react if traditional uses are likely to be affected.

Native American Concerns: A diversity of deeply rooted cultural traditions is one of the special characteristics which New Mexico offers. In addition to enriching the lives of its citizens, this cultural diversity is one of the cornerstones of New Mexico's tourist industry. Congress made it clear in the El Malpais legislation that it expects the NCA, including the Cebolla Wilderness Unit, to be managed in ways that accommodate the needs of traditional Native American peoples and that allow the continuance of traditional cultural practices.

Assumptions

* Historical Native American uses of El Malpais have been gradually displaced over the past four centuries.

* Important Native American uses of El Malpais do continue, particularly uses involving religion and traditional cultural practices.

* Religious and other traditional cultural practices often require privacy and extreme secrecy. Even speaking of some places can be a form of desecration.

* Continuous communication and interaction with Native American groups are necessary in order to maintain the personal relationships which provide a basis for trust and mutual respect.

Policy

* PL 100-225 requires close consultation with Native American groups during the planning process.

* PL 100-226 requires that access for continued traditional cultural purposes be allowed, and allows the temporary closure of special areas to ensure privacy.

* The American Indian Religious Freedom Act requires federal agencies to consider the effects of their actions upon the practice of traditional Native American religions.

* Vehicular access may be allowed two times per year to a particular place in Cebolla Wilderness to accommodate traditional Native American religious practices if the BLM Area Manager determines that such access is the minimum tool necessary to allow practice of traditional religion.

Management Prescriptions and Actions

The following prescriptions and actions are proposed to accommodate the needs of traditional Native American peoples and allow the continuance of traditional cultural and religious practices.

TABLE 4-17
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR NATIVE AMERICAN CONCERNS

		Affected Environment	
Management Prescription	Action	Natural (BLUs)	Human
Protect continued use of unit by Native Americans	Guarantee reasonable access for traditional cultural & religious activities	All	
	Avoid placing public use facilities in sensitive areas	All	
	Use trail placement & other design factors to direct visitor use away from identified sites of traditional religious or cultural activities	All	
Encourage respect for Native American viewpoints	Protect Native American interests over long term by continued consultation & liaison w/ interested local Indian tribes		
	Develop interpretive materials in cooperation w/ interested local Indian tribes		
	Conduct cultural sensitivity training for law enforcement & other key field personnel		
Reaffirm equal employment opportunity for Indian people in NCA staffing	Target law enforcement position for Native American hire		
	Target interpretive specialist position for Native American hire		

Section 6
Cebolla Wilderness Unit Environmental Assessment

INTRODUCTION

This section represents an analysis of the effects to the environment that would result from implementing the preferred and low change alternatives. Refer to Chapter 2 for a description of the low change alternative and to Chapter 4 for a description of the actions proposed for the Cebolla Wilderness Unit under the preferred alternative. A complete description of the affected environment in the National Conservation Area is in Chapter 1. Chapter 2 and Appendix G provide a detailed summary of consultation and public input.

ENVIRONMENTAL CONSEQUENCES OF THE PREFERRED ALTERNATIVE

In general, prescriptions developed under the preferred alternative would maintain wilderness character and assure that natural ecological processes be allowed to operate freely with a minimum of human interference. Recreational use of the Cebolla Wilderness would be accommodated with a focus on visitor management and resource protection. Primitive and unconfined recreational opportunities would be maintained. To manage wildlife habitat, the BLM would emphasize the conservation of diverse habitat types in their natural condition and the natural ecological succession of biological populations. Range resources would be managed to provide for the continuation of grazing while protecting wilderness values and natural resources. Forage condition and the range improvements and water supply that range management relies on would be maintained. Cultural resources in the Cebolla Wilderness would be managed with an emphasis on future scientific use and, to a lesser extent, managed for future and current public use. Native American uses of the Cebolla Wilderness Unit would be continued with an emphasis on ensured access. Privacy and respect for traditional cultural resource practices and improved communication and cooperation with local Native American groups would be continued.

Impacts to Naturalness

The Cebolla Wilderness Unit was designated through the El Malpais legislation. The area exhibits qualities of naturalness and solitude, as well as ample opportunity for primitive and unconfined recreation. Human impacts in the unit are rare, and the area is particularly rich in supplemental values. Prescriptions designed to protect naturalness focus on restoration of impacts to naturalness that have occurred from authorized and unauthorized actions over the past 50 years, and on resource protection. Resource protection prescriptions are designed to prevent any further impacts.

Under the preferred alternative, naturalness would be retained and protected over the long term. The existing natural character, the opportunities for solitude and non-motorized recreation, and supplemental values of diverse productive wildlife habitat, cultural resources, and visual qualities would be maintained.

In conclusion, prescriptions designed to maintain naturalness would assure protection of natural ecological systems. Human interference would be minimized and would be allowed only where manipulation is necessary to bring ecosystems back into natural balance where man has disturbed natural cycles. Wilderness character maintenance concerns are supplemented by wildlife, range, and cultural resource prescriptions.

Impacts to Recreational Use

The 62,800-acre Cebolla Wilderness Unit provides opportunities for primitive and unconfined recreation.

Some zones in the unit are readily accessible from paved roads, allowing expanded day-use opportunities. Visitor use is expected to increase over the next 10 years which may increase demand for visitor services and increase impacts to natural or cultural resources. Specific prescriptions designed to provide recreation use of the Cebolla Wilderness focus on visitor management and resource protection.

Visitor management prescriptions would direct and monitor recreational use at sites in the Cebolla Wilderness which are already heavily used such as La Ventana Natural Arch and the south end of the Narrows. At least one trailhead would be developed and other points along NM 117 would be monitored to address future recreational need within high use zones. Implementation of visitor management prescriptions would maintain primitive and unconfined recreation opportunities.

Resource protection prescriptions provide measures to limit resource damage associated with visitor use. Facilities to accommodate visitor use such as trails would be constructed only if resource damage is threatened. Limiting facility development would provide visitors a natural setting. Information and education would be provided to visitors to enhance visitor understanding of natural and cultural resources and preserve wilderness character by influencing human behavior.

In conclusion, recreational use would be accommodated at existing heavily used sites. Visitor use would be monitored throughout the unit and actively managed only where resource damage was threatened or damaged. No facilities would be developed for visitor convenience or comfort within wilderness boundaries. Facilities would be designed to provide maximum protection to wilderness character and to natural and cultural resources.

Impacts to Range Management

Range resources would be managed to provide for the continuation of grazing while protecting wilderness values, natural resources, and the wildlife habitat found there. Forage condition and the range improvements and water supply that range management relies on would be maintained. Prescriptions for range management focus on forage condition, range improvements, and water availability.

Forage condition would be maintained at level or increasing trends resulting in long-term improvement in vegetation condition. Adjustments in grazing management could be necessary to improve forage on four allotments. Adjustments could include the development and implementation of grazing management systems and construction of range improvements.

Range improvements such as fences, watering devices, and/or erosion control measures would be constructed only where needed to restore natural ecological processes. Existing range improvements would be maintained to prevent the range resource from degrading. Range improvement maintenance under wilderness management policy is addressed in the draft Cebolla Wilderness Range Improvement Management Plan (RIM) and Environmental Assessment (USDI, BLM 1990). The RIM plan addresses how allotment operators and the BLM will coordinate the maintenance of existing range improvements. Particular attention would be paid to the conditions under which the use of mechanized equipment could occur.

The Cebolla Wilderness Management Plan recommends that a continued water supply for livestock be provided by allowing access by allottees for maintenance purposes. Allottee access for range improvement is also addressed in the RIM plan.

In conclusion, range resources would benefit from the implementation of the preferred alternative by providing for the improvement of forage condition and trend, maintenance of existing range improvements including water, and the development of additional improvements where necessary to maintain natural ecological processes.

Impacts to Wildlife Habitat Management

Prescriptions developed for wildlife habitat management emphasize the conservation of diverse wildlife habitat types in their natural condition while providing visitor use and access.

Natural ecological succession of biological populations would be emphasized. Prescriptions developed for wildlife habitat focus on water availability, forage and browse condition, special use areas, and species management.

Under the preferred alternative, existing developed waters (13 sites) would be maintained and other sites with water under private ownership would be proposed for acquisition or management under cooperative agreement. Forage and browse condition would be maintained on four allotments. Nine wildlife seeding exclosures would remain in the unit to provide protected, high quality habitat for wildlife. The unit would be inventoried to determine special use sites to protect wildlife during sensitive times (such as nesting season) and in sensitive areas from interactions with humans. Those sites, once discovered, would be protected from disturbance.

Portions of the unit would be studied to determine the capability of the unit to support a reintroduced population of desert bighorn sheep and determine potential resource conflicts. The study would focus on water availability, escape cover, forage type, presence of roads, fences, trails and other facilities, and distance from domestic sheep herds. Cattle grazing management and potential conflicts would be considered.

In conclusion, wildlife habitat would be maintained in its present condition to support the existing diversity of wildlife species (with the exception of possible reintroduction of desert bighorn sheep). Natural ecological succession of wildlife species would be maintained with an emphasis on protection of special use areas.

Impacts to Cultural Resources

Cultural resources in the Cebolla Wilderness would be managed with an emphasis on future scientific use and, to a lesser extent, managed for future and current public use. The Cebolla Wilderness Unit contains most of the cultural resources in the NCA. Presently, about 2.6 percent of this unit has been inventoried for cultural resources and 158 archeological sites have been recorded. The principle threats to cultural resources in the Cebolla Wilderness Unit are vandalism and surface collection, natural deterioration, and conflicts with other resource uses.

Prescriptions designed to protect cultural resources in the Cebolla Wilderness are essentially the same as prescriptions described for the Conservation Unit--except sites and acreage figures are changed to reflect differences in the two units. Refer to Section 4, Chapter 3 for a description of impacts associated with cultural resource prescriptions.

In conclusion, implementation of the preferred alternative for cultural resources could inhibit vandalism, curb surface collection of artifacts, retard natural deterioration of cultural resources and minimize the impact of BLM-authorized actions including scientific study.

Impacts to Native American Issues

Local Native Americans (Acoma, Laguna, Zuni, and Navajo) have historically or are currently using portions of the Cebolla Wilderness Unit for traditional and religious purposes including collection of plant materials, use of some areas as shrines, and the continuation of livestock grazing practices.

Prescriptions designed to address Native American concerns are exactly the same for the Cebolla Wilderness Unit as those described for the Conservation Unit. Therefore, impacts associated with implementation of the preferred alternative are the same as impacts to Native American Issues already described in the Conservation Unit environmental consequences discussion in Chapter 3, Section 4.

In conclusion, implementation of the preferred alternative would ensure access for traditional Native American cultural practices, ensure privacy and respect for those practices, and foster an atmosphere of communication and cooperation with local Native American groups.

ENVIRONMENTAL CONSEQUENCES OF THE LOW CHANGE ALTERNATIVE

The Low Change Alternative is an alternative to the proposed plan. The Low Change Alternative contains only the minimum changes to the existing environment and existing management that would be necessary to meet the intent of the El Malpais legislation. In most cases, the Low Change Alternative is a reflection of existing conditions in the NCA and is a description of how the BLM is managing the NCA before the GMP is approved.

As does the Preferred Alternative, the Low Change Alternative presents management prescriptions for each of the planning issues.

Impacts to Naturalness

Naturalness would be protected primarily through indirect methods under the Low Change Alternative. The public would be provided information about the wilderness resource through offsite interpretation. Supplemental wilderness resource values would be managed only if threatened. Additional adverse impacts could result from illegal or unauthorized activities due to the lack of or reduced levels of monitoring and enforcement. The Continental Divide Trail would be routed through the Cebolla Wilderness which could reduce naturalness in the wilderness unit.

In conclusion, naturalness would be maintained except for the Continental Divide Trail. Potential wilderness-enhancing opportunities would be foregone under the Low Change Alternative.

Impacts to Recreational Use

Implementation of the Low Change Alternative would allow maintenance of existing recreational opportunities. Development of facilities would be provided only when damage to wilderness resources was highly probable as a result of increased visitor use. Areas threatened by public use would be closed to visitor access to protect resources. Public information and education would be provided offsite without coordination with research and teaching institutes. Recreational objectives described in the RMP for this area could be carried out. The Continental Divide Trail would be routed through the Cebolla Wilderness rather than the west side route described in the Preferred Alternative (refer to Maps C-1 and C-2 in Appendix C).

The recreational experience of visitors associated with wildlife viewing, visual resources, and experiencing other resource values would be maintained.

In conclusion, recreational use of the Cebolla Wilderness would be concentrated and restricted to areas along NM 117, and other recreational use would be maintained unless visitor use threatened wilderness resources.

Impacts to Range Management

The Low Change Alternative would continue to emphasize range management of 3 allotments. Development of water and other range improvements would be possible on 3 allotments only if resource damage were occurring. Maintenance of existing range improvements would be accommodated through the RIM plan. Conflicts with other resource users such as recreational use could increase without an interpretation and education program. Other impacts to range would be similar to those described under the Preferred Alternative.

In conclusion, forage condition for livestock would be maintained in its existing condition. Range improvements would be maintained, and a minimum of new improvements would be developed only if resource conditions were threatened.

Impacts to Wildlife Habitat

Implementation of the Low Change Alternative would allow the presence of existing habitat improvement facilities (9 exclosures). Critical wildlife waters would not be acquired or managed cooperatively with the landowner. Conflicts with grazing use could increase in critical areas especially near water development with maintenance of current grazing systems and range improvements. Desert bighorn sheep would not be reintroduced. Other impacts to wildlife would be similar to those described under the Preferred Alternative.

In conclusion, implementation of the Low Change Alternative could cause a reduction in existing habitat diversity and current population levels. Natural ecological succession would continue.

Impacts to Cultural Resources

For cultural resources, the Low Change Alternative is one that minimizes changes in the existing condition of the NCA's cultural resources. Therefore, the Low Change Alternative consists of the strongest, most aggressive management actions to ensure little change in the resources. Under this alternative, the BLM would implement stronger prescriptions for the long-term protection and interpretation of archeological and historic properties in the Cebolla Wilderness Unit. Routing the Continental Divide Trail through this high density cultural resource unit could result in increased surface collection of cultural resources in the Cebolla Wilderness.

In conclusion, implementation of the Low Change Alternative would result in stronger actions to protect cultural resources, resulting in increased horseback or hiking patrol and surveillance, higher levels of inventory on more acres, and more erosion control projects than actions described in the Preferred Alternative.

Impacts to Native American Issues

Impacts to Native American concerns would be the same under the No Action Alternative as those described under the Preferred Alternative.

CHAPTER 5

West Malpais Wilderness Unit Management Plan

Chapter 5
West Malpais Wilderness Unit Management Plan

Section 1
Introduction

PURPOSE OF THE PLAN

As one management unit of the NCA, the West Malpais Wilderness will be managed in accord with the overall philosophy and goals of the NCA (refer to Chapter 1). In addition, the El Malpais legislation requires the BLM to prepare a separate management plan for the West Malpais Wilderness. The management plan contained in this chapter provides guidance for management of the West Malpais Wilderness. Specific goals for the West Malpais Wilderness are described. It also establishes the objectives, policies, and management prescriptions and actions which will guide administration of the West Malpais Wilderness. These have been designed to meet the established wilderness goals.

Resource management objectives for resource programs operating in the West Malpais Wilderness prior to wilderness designation have been updated as part of this plan. This plan provides general management direction covering the 10 year period from 1990 to 2000. Revision processes are the same as those used for the same as the rest of the GMP (refer to Chapter 1).

ORGANIZATION OF THE PLAN

This chapter is divided into four sections. Wilderness management information is presented in a progression from the general to the specific. Section 1 describes the purpose and structure of the plan. Section 2 introduces the reader to the West Malpais Wilderness. Section 3 presents the basic management guidance provided by broad national goals, and one additional goal specific to the West Malpais Wilderness. The wilderness management program is presented in Section 4. Section 5 is the environmental analysis for the wilderness management plan.

Specific management objectives are described for seven overall issues identified by the public and BLM resource specialists. They include: naturalness, recreation, range management, wildlife habitat management, scientific study, cultural resources, and Native American concerns. Each objective describes wilderness conditions to be achieved to assure progress toward the established goals. The current situation, program management assumptions, and management policies are also described for each issue. Specific elements of concern related to each issue are then described, followed by specific management prescriptions and actions for each element. The management prescriptions and actions have been designed to help attain the conditions described in each issue's objective. The management prescriptions and actions were developed using existing inventories, current knowledge of resources, public input, and the conditions existing at the time of wilderness designation. A summary of the wilderness issues and related elements follows:

Wilderness Issue	Specific Element
Naturalness	Restoration
	Resource Protection
Recreation	Visitor Management
	Interpretation and Public Education
Range Management	Desired Plant Communities
	Range Improvements
Wildlife Habitat Management	Special Use Areas
	Species Management
Scientific Study	Research and Data Collection
Cultural Resources	BLM Authorized Actions
	Vandalism and Surface Collecting
	Natural Deterioration
	Public Information and Education
Native American Issues	Native American Concerns

As indicated in Chapter 1, the implementation and monitoring chapters have been deferred to the Final GMP, after the public has commented on the proposed prescriptions and actions. The monitoring and implementation chapters will describe the detailed tasks necessary to achieve the prescriptions and actions. They are equivalent to site planning, and will include priority of implementation and basic costs. The Limits of Acceptable Change (LAC) monitoring system will be used for the West Malpais Wilderness, as well as the remainder of El Malpais Natural Conservation Area.

Section 2
Wilderness Overview

BACKGROUND AND LOCATION

The West Malpais Wilderness Unit consists of 39,600 acres located in the central portion of the NCA. The location and boundaries of the unit are shown on Map 5-1.

The West Malpais Wilderness was designated by the El Malpais legislation. It is predominantly natural and exhibits outstanding opportunities for primitive and unconfined recreation. Human impacts are rare, consisting of temporary disturbances of soil and vegetation in camp areas. Disturbances are visually subtle, generally recovering on an annual basis. The West Malpais Wilderness Unit's supplemental values include ecological complexity where older basalt flows meet with more recent flows, scenic values, a variety of reptiles, antelope habitat, many species of birds, diverse lichens with research potential, and playa lakes.

The West Malpais Wilderness is administered by BLM offices in Grants and Albuquerque. The Grants Field Station provides on-the-ground presence and operational management. The Rio Puerco Resource Area and the Albuquerque District Office, both in Albuquerque, provide other support.

OWNERSHIP AND BOUNDARY DESCRIPTION

The West Malpais Wilderness Unit contains both federal and private lands. Private inholdings include 2,300 acres of surface estate. When designated wilderness in 1987, approximately 25,600 acres of private subsurface estate existed in West Malpais. By the end of 1990, it is expected that all subsurface estate will have been acquired, except the 2,300 acres below the private surface.

The King Brothers are the primary private surface landowner, with 19 others having smaller inholdings. The primary use of the King Brothers inholdings is grazing. The smaller private surface inholdings (T15N, R7W, Sec. 26) were purchased as cabin sites; no sites have been developed. (Traditional access to these private properties is approximately 3/4 mile, crossing Sec. 27, T13N, R7W.) Several of these landowners have expressed interest in selling or exchanging their property. A line camp located on one parcel of the King Brothers private inholdings includes a house and corrals.

Boundary Description

For most of its length, the West Malpais boundary either parallels roads or abuts with the National Monument boundary (refer to Map B). Where the West Malpais Wilderness is bounded by CR 42 and a graded road the boundary is located 100 feet from the apparent centerline of the roads.

A graded road is "cherry-stemmed" into the southeastern boundary of the wilderness. The road travels in a northwesterly direction through Sections 2, 11, and 12 (T6N, R12W) for approximately 2 miles to the intersection with the northern boundary of Section 2 (T6N, R12W) where the wilderness boundary crosses the "cherry-stem" road.

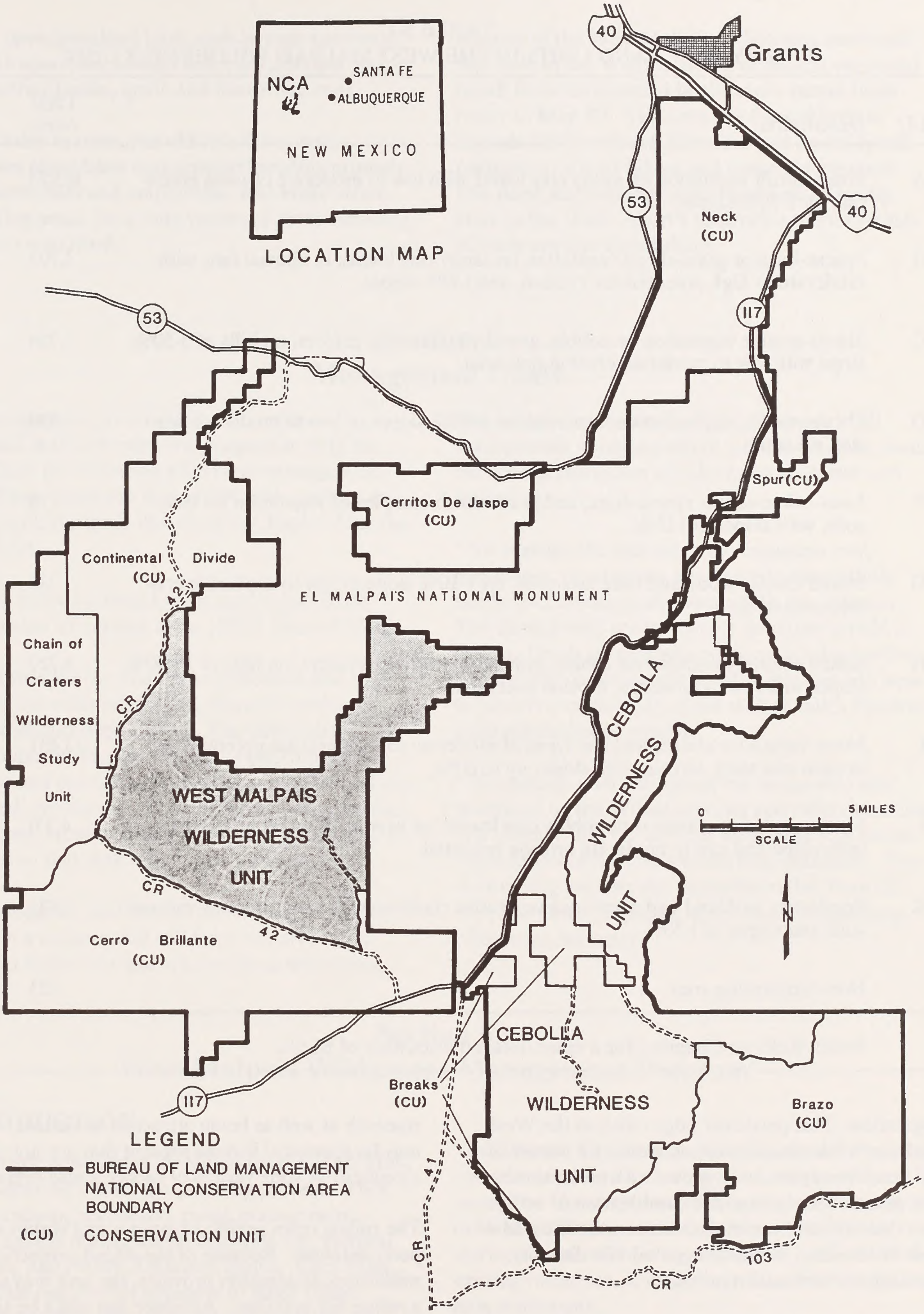
As required by the El Malpais legislation, a complete description of the wilderness boundary was submitted to Congress in March 1990. A complete set of 7.5 minute topographic maps displaying the boundaries is available at the Rio Puerco Resource Area Office in Albuquerque.

Section 3
Unique Features of the West Malpais Wilderness

The West Malpais contains a variety of resource values, including visual values, a variety of plant and animal species. Table 5-1 contains brief descriptions and quantification of the different ecotypes represented in West Malpais Wilderness Unit, as described by Biophysical Land Units (discussed more fully in Chapter 1 and displayed on Map A). Diverse viewscapes are available to those visiting the West Malpais Wilderness.

The volcanic plains of the West Malpais Wilderness form a low rolling terrain that offers broad distant panoramas of volcanic fields, sandstone bluffs and ridges, and cinder cones. Flowing, rolling, gently sloping lines dominate the near terrain and contrast with the broken lines of the more recent lava flows.

Where older basalt flows meet with more recent flows, an ecological edge effect can be seen in the



MAP 5-1
WEST MALPAIS WILDERNESS UNIT

TABLE 5-1
BIOPHYSICAL LAND UNITS IN THE WEST MALPAIS WILDERNESS UNIT

BLU	Description	Total Acres	% of Unit
A	Grass-shrub vegetation on sandy clay loams with low to moderate erosion potential, on 1-10% slopes.	10,225	16
B	Sparse-bare or grass-shrub vegetation on sandy clay loams, in alluvial fans with moderate to high potential for erosion, and 1-10% slopes.	1,792	3
C	Shrub-conifer vegetation on cobbly, gravelly loams over cinders, on hills of 3-50% slope with low to moderate erosion potential.	3,786	6
D	Shrub-conifer vegetation on lava soils, on 1-10% slopes of low to moderate erosion potential.	338	.5
F	Lava-lichen-shrub, sparse-bare, and grass-shrub complex of vegetation on lava soils, with slopes of 1-12%.	5	.01
G	Mixed conifer woodland over lava soils, on 1-10% slope of low to moderate erosion potential.	788	1
H	Mixed conifer woodland on cobbly, gravelly loams over cinders, on hills of 10-50% slopes with low to moderate erosion potential.	4,727	8
I	Many vegetative classes and soil types of moderate to high erosion potential, on broken and steep terrain, with slopes up to 60%.	33,431	54
J	Many vegetative classes over cobbly clay loams, on very broken terrain of up to 60% slope and low to moderate erosion potential.	4,371	7
K	Ponderosa parkland and deciduous vegetative classes on volcanic and non-volcanic soils and slopes of 1-30%.	2,815	5
	Non-conforming area	123	.2

Note: Refer to Chapter 1 for a more detailed discussion of BLUs.

vegetation. This particular edge effect in the West Malpais Wilderness is characterized by a border of tall ponderosa pine undergrown with grass, shrub, and pinon. This is a species combination or ecosystem that does not occur elsewhere in the West Malpais Wilderness. It encourages wildlife diversity, particularly birds and reptiles.

The lava soils and outcrops support at least seventy species of lichens of varied colors and textures. The diversity of these lichens is potential interest for research as well as being attractive to visitors. There may be species of lichens present that are not yet classified. A wide variety of cactus is also present.

The rolling open prairie of grasses and shrubs supports antelope. Because of the added protection wilderness designation provides, the unit may serve as a refuge for antelope. Antelope can often be sighted along CR 42. The prairie is also home to coyotes, jackrabbits, a variety of reptiles, and many species of birds not found in other types of habitats. These include open grassland birds such as sage sparrows, savannah sparrows, horned larks, grasshopper sparrows, harrier hawks, quail, and burrowing owls.

During rainy seasons, the old lava flows create numerous playa lakes that provide breeding grounds for invertebrates and amphibians, and make attractive loafing areas for a wide variety of birds including migratory waterfowl.

An arm of the West Malpais Wilderness surrounds Big Hole in the Wall, an island of ancient vegetated basalt flows surrounded by the more recent flows (refer to Map B). This area has figured both in legends and in western literature and probably will continue to attract hikers and overnight campers. Elk, deer, and antelope have been sighted in Big Hole in the Wall. Abert's squirrels and many kinds of birds are also found there.

Section 4
Management Goals

The management prescriptions and actions developed in this chapter are designed to help the BLM attain the following wilderness management goals. These goals are compatible with, and are an extension of, the goals described in Chapter 2 for the entire NCA.

The four following broad goals apply to all BLM-administered wilderness areas (BLM Manual 8560):

* To provide for the long-term protection and preservation of the unit's wilderness character under a principle of non-degradation. The unit's natural condition; opportunities for solitude; opportunities for primitive and unconfined types of recreation; and any ecological, geological, or other features of scientific, educational, scenic, or historical value present will be managed so that they will remain unimpaired.

* To manage the unit for the use and enjoyment of visitors in a manner that will leave the area unimpaired for future use and enjoyment as wilderness. The wilderness resource will be dominant in all management decisions where a choice must be made between preservation of wilderness character and human use.

* To manage the unit using the minimum tool, equipment, or structure necessary to successfully, safely, and economically accomplish the objective. The chosen tool, equipment, or structure should be the one that least degrades wilderness values either temporarily or permanently. Management will seek to preserve spontaneity of use with as much freedom from regulation as possible.

* To manage nonconforming but acceptable uses permitted by the Wilderness Act and subsequent laws in a manner that will prevent unnecessary or undue degradation of the unit's wilderness character. Nonconforming uses are the exception rather than the rule; therefore, emphasis is placed on maintaining wilderness character.

Section 5
West Malpais Wilderness Management Program

INTRODUCTION

Seven major issues were identified for the West Malpais Wilderness during the planning process. They are naturalness, recreation, range management, wildlife habitat management, scientific use, cultural resources, and Native American issues. Each issue has at least one overall objective to guide future management direction. The current situation described for each issue is followed by management assumptions and policy statements, and management prescriptions and actions.

The "Current Situation" section describes the existing resource condition including problems, trends, and uses. The "Assumptions" section explains expectations based on the current situation. The "Policy" section enumerates policy statements pertinent to the existing resources, management situation, and planning statements.

Management prescriptions and actions for each issue are discussed by specific elements of concern that expand upon each individual issue. Specific management prescriptions and actions are displayed in a table for each management element. These are designed to help attain the conditions described in each of the issue objectives.

This plan for managing the West Malpais Wilderness Unit has been developed within a well-defined set of parameters. These parameters result from the El Malpais legislation and its emphases; other laws that apply to the lands and resources in the unit; BLM program policy, guidance, operating procedures, and fiscal constraints; data about the ecotypes contained in West Malpais Wilderness and their capabilities and limitations; public input; and assumptions about how these and other factors may affect management of the unit. All of these parameters taken together provide the framework for analyzing and recommending actions to be taken in managing the West Malpais Wilderness Unit.

NATURALNESS

Management Objective for Naturalness

PROTECT AND PRESERVE OVER THE LONG TERM, THE NATURAL CHARACTER OF WEST MALPAIS WILDERNESS BY ALLOWING NATURAL SYSTEMS TO OPERATE FREELY WITH MINIMAL HUMAN INTERFERENCE.

Current Situation

General Information: While the West Malpais Wilderness is considered predominantly natural, it nevertheless has been influenced by humans to some degree. Historic use includes fuelwood gathering and grazing of both sheep and cattle. More recent uses include cattle grazing, scientific research, and dispersed recreation. These uses have resulted in the development of roads, earthen dams, one windmill, and fencelines. An actively used line camp located on a private inholding includes a house and corrals.

Approximately 35 miles of vehicular ways (unmaintained roads and two-tracks) that existed prior to wilderness designation are readily accessible from five points of entry along the western and southern boundaries of the West Malpais Wilderness. These have resulted in vehicular trespass in the wilderness although the wilderness boundaries are signed. Approximately 20 miles of these vehicular routes will continue to receive limited use by allottees to maintain existing range improvements. This use will occur according to the terms of the West Malpais Wilderness Range Improvement Maintenance Plan (refer to Range Management section below).

Waters in West Malpais Wilderness are developed for cattle or wildlife. The quality of waters in the West Malpais Wilderness is unknown.

Restoration: Maintenance and enhancement of naturalness is inherent in the goals set for the management of the West Malpais Wilderness Unit. At the heart of this focus is the concept of protecting natural systems and allowing them to operate freely, with minimal human interference. Since the West Malpais Wilderness has a history of human use that has modified the functioning of natural ecological processes, some manipulation of natural processes is warranted. Management strongly emphasizes maintaining, and if necessary, enhancing the natural ecosystem and its processes.

Approximately 20 miles of vehicular routes not being used on a limited basis by allottees should be restored to natural conditions.

Protection: Within the West Malpais Wilderness, visitors have ready, non-mechanized access to sensitive habitats including playa lakes utilized by waterfowl. This easy access combined with an increased demand for wilderness areas close to urban populations (refer to Recreation section, below) will likely result in greater recreation use of the West Malpais Wilderness. This will increase opportunities to introduce visitors to a variety of natural resources, and to develop an understanding and appreciation of these resources. However, this opportunity could also result in damage to unique and sensitive habitats. Sensitive habitat is determined by the survival needs of each species of plant or animal, which vary considerably. A more complete discussion of sensitive habitats is found in the Wildlife Habitat Management section, below.

The terrain of the West Malpais Wilderness is open and expansive and offers opportunities for viewing scenic vistas of great distance. Such viewsheds make any deterioration of visibility readily apparent. The West Malpais Wilderness is being managed as Visual Resource Management Class I which provides for primarily natural ecological change.

Approximately 2,300 acres of private inholdings occur within the boundaries of the West Malpais Wilderness. The majority are used for grazing. One private parcel contains an active line camp, including a house and corrals. Section 23, T13N, R7W, has been subdivided for cabin sites. One 40-acre site has been acquired. Several other private owners have expressed an interest in selling or exchanging their properties. These acquisitions are a priority for acquisition in the Land Protection Plan (refer to Appendix B). Most access to private parcels occurs on a 3/4 mile existing vehicular way, directly off of CR 42. Acquisition of these inholdings would assure that no future incompatible uses would occur.

The windmill located on public lands within West Malpais Wilderness acquired from the state of New Mexico. Its maintenance needs will be managed by West Malpais RIM Plan, assuring effective protection of naturalness.

Protection of West Malpais' naturalness is amplified in all of the issue discussions which follow.

Assumptions

* Actions need to be taken to prevent any future damage from unauthorized uses.

* Vehicular trespass will continue unless sufficient barriers are constructed to restrict access to the interior of the wilderness.

* The nonconforming but acceptable use of established livestock grazing will continue.

* Limited vehicular access by allottees will be regulated by the terms set forth in the Range Improvement Maintenance Plans (USDI, BLM 1990).

* Recreational use of the West Malpais Wilderness will increase.

* Impacts to naturalness will occur from both authorized and unauthorized human use.

* Funding will be available to implement this plan.

Policy

* All effects of unauthorized uses will be rehabilitated and restored to a natural condition.

* The BLM wilderness management policy (Manual 8560) will be used to guide management decisions or plan modifications.

* Wilderness areas generally appear to have been affected primarily by the forces of nature, with the imprint of man generally unnoticeable. Wilderness policy does allow for some manipulation of wilderness resources to bring ecosystems back into natural balance where humans have disturbed natural cycles.

* Management actions prescribed to maintain or enhance existing values, or rehabilitate the wilderness from past human actions must utilize the tools, equipment, or structures which least degrade wilderness values either temporarily or permanently.

* Where the exercise of rights of access to surrounded private land would be detrimental to wilderness values, efforts to acquire such land by purchase or by exchange will be pursued.

* Persons and their successors in interest who own land completely surrounded by wilderness must be given such rights as may be necessary to assure adequate access to that land. Adequate access (identified by the BLM) is defined as the combination of routes and modes of travel which will cause the least impact on the wilderness resource while still assuring reasonable access. Reasonable access in determined on a case-by-case basis.

* The BLM allows fire to play a natural role in the wilderness ecosystem. All fires must be controlled to prevent loss of human life or private property within wilderness areas or to prevent the spread of fire to areas outside of the wilderness where human life, resources, or property may be threatened. Human-caused fires must be prevented and/or controlled unless the fire meets wilderness fire management objectives.

* Natural fire is part of the ecology of the wilderness and human efforts to ban this agent may have resulted in significant ecological changes. To return to a more natural state, natural fires may be allowed to burn in accordance to an approved Fire Management Plan.

* Prescribed burning may be used to reintroduce or maintain the natural condition of a fire-dependent ecosystem; where past fire control measures interfered with natural ecological processes; where a primary value of the wilderness would be perpetuated

as a result of burning; or where a threatened or endangered species would be perpetuated. Prescribed burning must occur only where natural fire does not meet wilderness fire management objectives and will be allowed on a case-by-case basis.

* Disturbed areas resulting from human activity which cannot rehabilitate naturally in a reasonable period of time will be reclaimed, recontoured to a natural slope, and reseeded with native plant species to estabish satisfactory ground cover equivalent to that existing prior to disturbance.

* All standing dead vegetation will be left in place, but dead and down vegetation may be used for campfires in amounts that can be replaced annually through natural accumulation.

* Soil compaction resulting from human use where natural plant establishment and succession is precluded will be prevented.

* The establishment of informal secondary trails will be minimized.

* The BLM manages designated wilderness areas for Class II air quality unless they are reclassified by the state. These standards will be maintained.

* BLM will monitor select air quality parameters under cooperative agreement with the National Park Service.

* Visual Resource Management Class I objectives will be maintained.

Management Prescriptions and Actions for Naturalness

The following prescriptions and actions are recommended to restore the West Malpais Wilderness to a natural condition. Existing impacts have resulted from both authorized and unauthorized actions occurring within the last 50 years.

TABLE 5-2
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR RESTORATION

		Affected Environment	
Management Prescription	Action	Natural (BLUs)	Human
Restore natural ecological processes	Continue to study grazing trends	ACDG	5 grazing allotments in West Malpais Wilderness
	Implement change in grazing practices if trend studies indicate the need		
	Develop allotment management plans w/consideration given to riparian zones (playas)		
Restore approximately 15 miles of old vehicular ways	Reseed w/native species if natural revegetation does not occur	ACDG	
Use natural & prescribed fire as a management tool	Develop Fire Management Plan based on issue prescriptions & actions described in this plan	ACDG	Human influences have interfered w/natural ecological processes
	Identify & map areas where naturally occurring or prescribed fires would maintain vegetation		Must consider effects of fire on natural resources
	Identify & map areas where cultural & historic resources would prohibit use of fire		Must differentiate between nonhistorical & historical trash
	Identify & map areas where reseeding may be necessary after fire		
Restore natural scenic quality	Evaluate structures related to authorized uses & determine methods of minimizing visual impacts	All	

The following prescriptions and actions are recommended to protect the West Malpais Wilderness from any further impacts which could result from authorized or unauthorized actions (except for those actions necessary to protect the wilderness resource, or public health and safety).

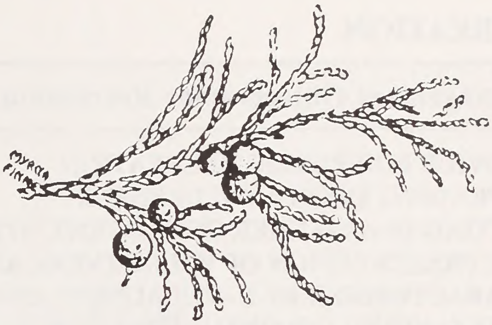


TABLE 5-3
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR RESOURCE PROTECTION

Management Prescription	Action	Affected Environment Natural (BLUs)	Affected Environment Human
Provide resource protection by promoting respect for natural resources of West Malpais Wilderness	Inform public about unusual geologic features of unit.	ACDG	
	Inform public of varied wildlife & plants found in unit	All	Attractive to campers, hunters, photographers
Protect playas	Treat as sensitive habitat	AB	Redirect recreation use
	Warn public of negative impacts resulting from camping near such areas.		
Assure natural processes w/minimum of human interference	Acquire private land & minerals by purchase or exchange as outlined in Land Protection Plan (Appendix B)	All	Development of private inholdings could be incompatible w/wilderness objectives
	Identify & establish least damaging access routes w/private landowners	A	
	Implement a program of low impact use of wilderness by horseback riders		
	Monitor to identify excessive soil compaction and/or, loss of ground cover along designated trails and camp areas.		
	Monitor to identify the creation of informal secondary trails	All	Human impacts frequently occur along trails & camp areas
	Monitor to identify any removal of dead vegetation for camp fires that exceeds the amount that can be replaced annually through natural succession		
Identify changes to natural processes before they become unacceptable	Establish the Limits of Acceptable Change (LAC) monitoring system (Appendix J) including a visual impact evaluation system		Human use of wilderness will impact resources
Deter unauthorized vehicular traffic into wilderness	Post additional signs along wilderness boundaries		Two tracks have historically been used
	Monitor & patrol for unauthorized access		
	Physically close vehicular access by fencing or barricading at wilderness boundary		

RECREATION

Management Objective for Recreation

PROVIDE FOR PUBLIC RECREATION DEPENDENT UPON A WILDERNESS SETTING IN A MANNER CONSISTENT WITH THE PRESERVATION OF WILDERNESS, AND CHARACTERIZED BY NATURALNESS AND OUTSTANDING OPPORTUNITIES FOR SOLITUDE.

Current Situation

General Information: The primitive recreation potential of the West Malpais Wilderness is derived from its diverse rolling terrain, dramatic vistas, and variety of wildlife. The area offers opportunities for hiking, photography, backpacking, and primitive camping. The ecotypes of the West Malpais Wilderness (refer to Map A) support a varied wildlife population offering good opportunities for wildlife viewing. Diverse bird species and reptiles favor open spaces of the West Malpais Wilderness. Abundant populations of lichens and cactus add to the opportunities for nature study. Isolation from the sights and sound of others is highly probable. The rolling terrain provides good topographic screening, usually buffering different user groups one from the other. The open grasslands and shrub country give a sense of isolation and solitude. Visitors can experience independence, closeness to nature, and self-reliance within an environment that offers a high degree of challenge and risk. The West Malpais Wilderness Unit's terrain and expansive views of both the NCA and National Monument produce dramatic contrasts in form, line, shape, and color. This, in turn, enhances the unit's visual appeal to visitors who are seeking a primitive natural setting.

Numbers and distribution of visitors to the wilderness are not yet completely documented. Visitor numbers are expected to be influenced by proposed NPS developments to the north of the West Malpais Wilderness (refer to Map B). A key access point from CR 42 is located along the southern edge of West Malpais Wilderness. From here, a maintained cherry-stem road proceeds north into the West Malpais Wilderness. A trailhead is proposed at the end of the cherry-stem. (Refer to Chapter 3, Conservation Unit, for a description of this proposal.) At present, natural processes are not noticeably affected by the presence or actions of recreators in the West Malpais Wilderness.

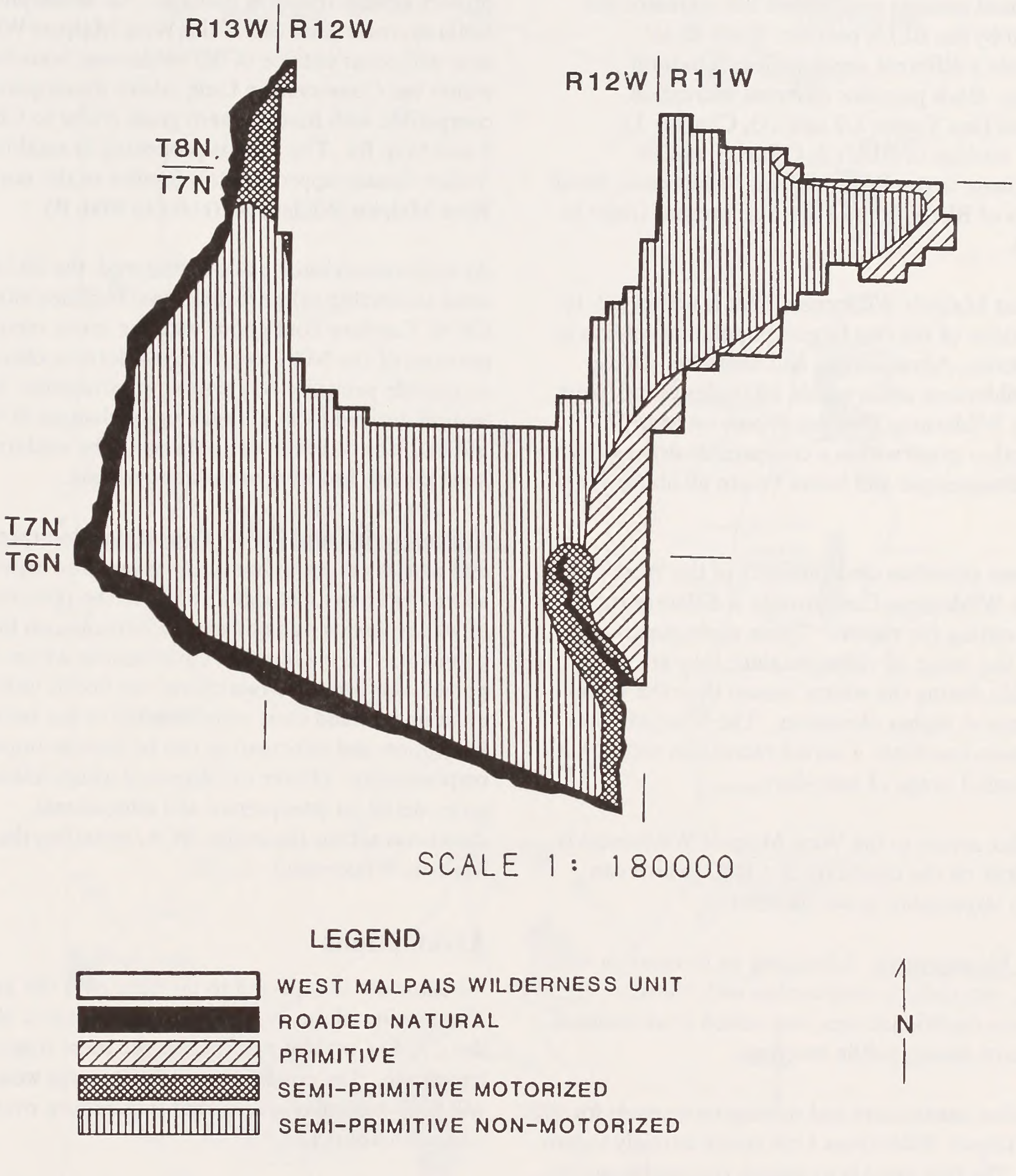
The system used to inventory recreation opportunity in the West Malpais Wilderness Unit is the Recreation Opportunity Spectrum (ROS). The ROS provides a framework for classifying outdoor settings and the recreation opportunities dependent on these settings. The system uses specific criteria to inventory recreational opportunities and to recommend management guidance for each class. (Refer to Appendix K for summary of this system.) All 39,600 acres of the West Malpais Wilderness have been classified according to this inventory system (refer to Table 5-4 and Map 5-2).

The ROS classifies about 34,900 acres (92 percent) of the West Malpais Wilderness as primitive and semi-primitive non-motorized. The semi-primitive non-motorized and primitive zones within the West Malpais Wilderness Unit provide recreation opportunities that are dependent on maintaining freely functioning ecosystems. These ecosystems are essentially independent of evidence of humans, administrative restrictions, and on-site controls.

TABLE 5-4
RECREATION OPPORTUNITIES IN THE WEST MALPAIS WILDERNESS UNIT

Opportunity Class	Acreage*	% of Unit
Roaded natural	2,800	5
Semi-primitive motorized	2,000	7
Semi-primitive non-motorized	32,200	80
Primitive	3,200	0
Total	39,700	100

Note: *Acreage is rounded to the nearest hundred acres.



MAP 5-2
RECREATION OPPORTUNITY SPECTRUM IN THE WEST MALPAIS WILDERNESS UNIT

A corridor along CR 42 and the cherry-stemmed road make up the approximately 8 percent of the wilderness that shows moderate evidence of human modification and technology, management restrictions and on-site controls.

The natural settings available to the recreator are reflected by the BLUs present. Each BLU represents a different combination of natural variables. Each provides different recreation attributes (see Tables 1-2 and 1-3, Chapter 1). Natural settings of BLUs A,C,D,F,G, and H predominate in the West Malpais Wilderness. Small amounts of BLUs B and I are also present (refer to Map A).

The West Malpais Wilderness Unit is within a 2- to 3-hour drive of the two largest population centers in New Mexico, Albuquerque and Santa Fe. Designated wilderness areas within 100 miles of the West Malpais Wilderness Unit are shown on Map 5-3. Those other areas within a comparable driving time from Albuquerque and Santa Fe are all above 7,000 feet.

The lower elevation environments of the West Malpais Wilderness Unit provide a different recreational setting for visitors. These environments also expand the range of visitation since they are more accessible during the winter season than the wilderness areas at higher elevations. The West Malpais Wilderness combines a varied recreation setting with an expanded range of user-days.

Vehicular access to the West Malpais Wilderness is dependent on the condition of CR 42, which can become impassable in wet weather.

Visitor Management: Managing an increase in visitor use, especially in conjunction with Native American traditional uses, was raised as an element of concern during public meetings.

Legislative parameters and management goals for the West Malpais Wilderness Unit speak strongly to two needs. The first need is to ensure reasonable access and privacy for Native American traditional and religious purposes. This need may result in closure of portions of the West Malpais Wilderness to the general public on a temporary basis to ensure privacy. The second is to allow recreation use while protecting the natural, physical, and social setting of the West Malpais Wilderness.

Recreation use of the West Malpais Wilderness Unit must occur hand-in-hand with protection of the wilderness resource, leaving it unimpaired for future use as wilderness. Easy access from CR 42 to unique features previously described will draw visitors, and will require development designed to direct use and protect against resource damage. All development to facilitate recreation use of the West Malpais Wilderness will occur outside of the wilderness boundaries within the Conservation Unit, where development is compatible with management goals (refer to Chapter 3 and Map B). The NPS is proposing to establish a Visitor Center approximately 8 miles to the north of West Malpais Wilderness (refer to Map B).

As wilderness visitor use is monitored, the BLM may need to develop other recreational facilities along the CR 42 Corridor contiguous with the more remote portions of the NCA to protect wilderness character or provide primitive recreation opportunities. Information derived from monitoring of changes in visitor use patterns or in the naturalness of the wilderness must dictate future management actions.

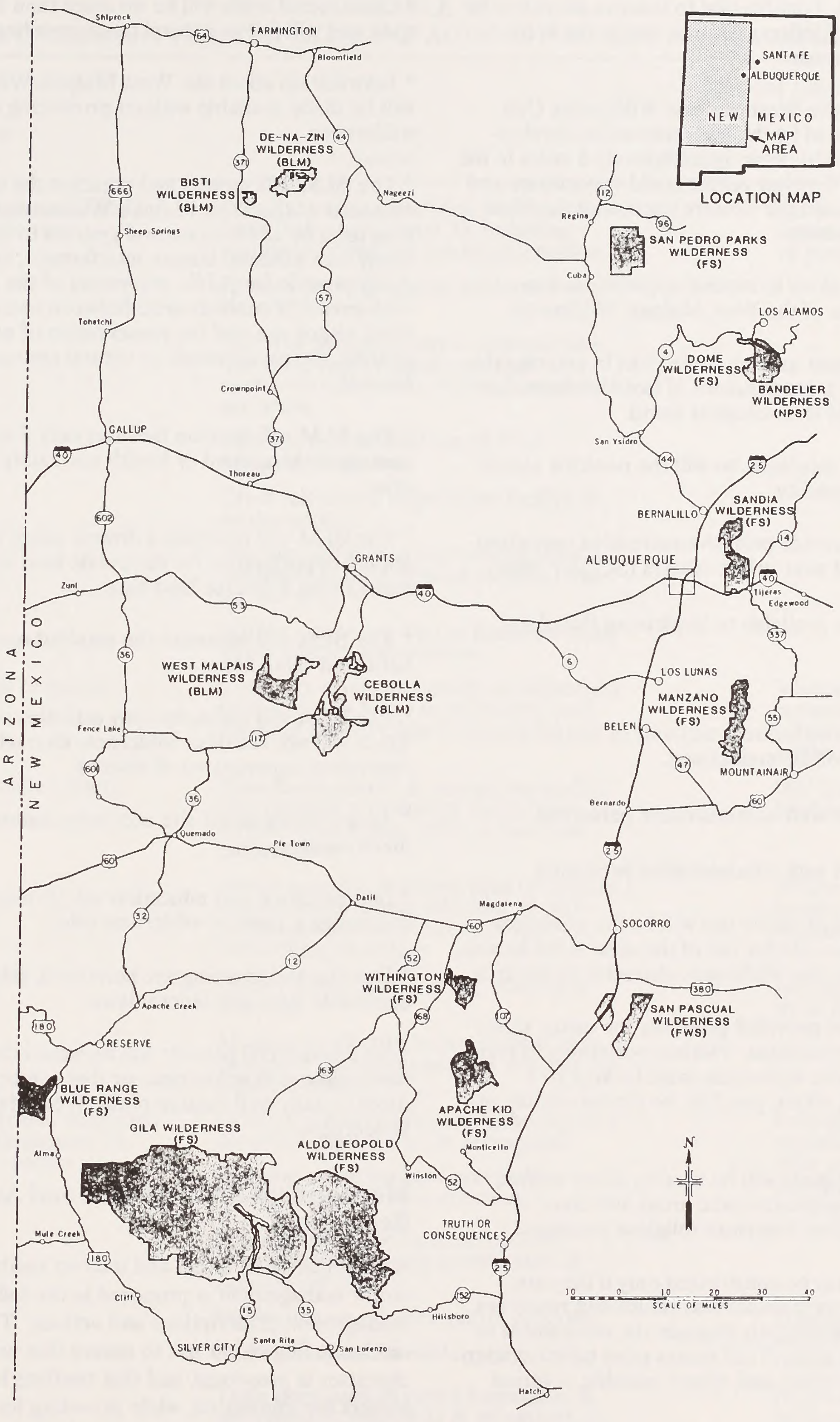
Interpretation and Public Education: Interpretation and education can enhance the recreation experience, as well as contribute significantly to the preservation of wilderness character through influence on human behavior. To preserve an environment where dispersed and primitive recreation can occur, visitors must understand their responsibility to the land. Education and information can be used to impart this responsibility. (Refer to Chapter 9 which follows for more detail on interpretive and educational directions set for the entire NCA, including the West Malpais Wilderness).

Assumptions

* Visitor use is expected to increase over the present. The portion of the West Malpais Wilderness along the CR 42 Corridor will receive the most concentrated use. The condition of CR 42 in wet weather will limit vehicular access, and thus reduce overall visitor numbers.

* Without effective protection of naturalness, primitive recreation opportunities will diminish.

* The opportunity to experience solitude may be diminished near CR 42, along the cherry-stemmed road, and adjacent to private inholdings.



MAP 5-3
WILDERNESS AREAS WITHIN 100 MILES OF THE NCA WILDERNESS AREAS

* The economic benefits tied to tourism described in Chapter 1 will influence visitor use in the West Malpais Wilderness.

* Visitation to the West Malpais Wilderness Unit may be influenced by the NPS recreation developments proposed to occur approximately 8 miles to the north. The NPS visitor center could concentrate and funnel visitors into the western portion of the West Malpais Wilderness.

* The BLM is likely to receive applications for commercial use of the West Malpais Wilderness.

* The visitor must assume some risks in entering the wilderness as a consequence of isolation from the conveniences of technological world.

* As visitation increases, so will the need for search and rescue capability.

* Lands that provide primitive recreation opportunities are needed near urban centers (SCORP 1986).

* Funds will be available to implement this plan.

Policy

* An emphasis on indirect methods of visitor management will be maintained.

* Limit contact with administrative personnel.

* Limit contact with administrative personnel.

* Management of visitor use will be the minimum necessary to provide for use of the area as wilderness, and to preserve the wilderness character of the area.

* Signs must be provided primarily for visitor safety and resource protection. Notices pertaining to regulations within the wilderness must be kept to a minimum and, where possible, be placed outside of the wilderness.

* Trail development will be used to direct visitors away from sensitive resource areas and areas of traditional Native American religious practices.

* New trails may be constructed only if they are needed to preserve wilderness values and resources and will not significantly degrade the naturalness or solitude of the area. Trail routes must be selected to provide scenic vistas and, where possible, a varied scene.

* Constructed trails will be no more than 24 inches wide and will follow natural contours where possible.

* Information about the West Malpais Wilderness will be made available without promoting the use of wilderness.

* The BLM will protect and preserve the natural character of the West Malpais Wilderness over the long term by allowing natural systems to operate freely with minimal human interference, and secondarily provide for public enjoyment of the area as wilderness. If conflicts arise between recreation or other visitor use and the preservation of natural systems, the preservation of natural systems will be favored.

* The BLM will develop facilities only if resource damage is threatened or health and safety issues arise.

* The BLM will maintain a diverse range of recreational opportunities for the public land user by maintaining a diverse land base.

* The BLM will minimize the establishment of hardened camp areas.

* The BLM will authorize only activities and uses which will not diminish wilderness character or the experience expectations of visitors.

* An emphasis on off-site user information will be maintained.

* Interpretation and education will be used to encourage a positive wilderness ethic.

* Hunting and trapping are permitted, subject to applicable state and federal laws.

* No commercial permits will be issued that are not compatible with wilderness, or that can be accommodated equally well outside of the West Malpais Wilderness.

Management Prescriptions and Actions for Recreation

A combination of direct and indirect methods of visitor management is proposed in the following management prescriptions and actions. They focus on channeling visitor use to ensure that wilderness character is preserved, and that conflicts between visitors are minimized, while providing for recreational use of the West Malpais Wilderness as wilderness.

TABLE 5-5
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR VISITOR MANAGEMENT

Management Prescription	Action	Affected Environment: Natural (BLUs)	Affected Environment: Human
Protect wilderness values by directing visitor use	Develop trailhead at West Malpais trailhead (refer to Chapter 3), including regulatory signs and safety information	I	Easy access requires direct management of people
	Provide parking outside wilderness boundary		
	Use trail design factors to channel visitors away from sensitive natural resources & sensitive Native American use areas		
	Monitor recreational use of West Malpais Wilderness		
	Erect self-issued registration facility at access point		
	Develop self-issued registration form & distribute at the trailhead to gather visitor use data		
	Gather visitor use data at trailhead using direct contact with visitors		
Protect visual resources	Construct trailhead outside of wilderness boundaries to blend in w/existing environment (VRM Class II standards)		Visitors anticipate natural setting in relationship to wilderness
Provide for visitor safety	Coordinate search & rescue responsibilities through cooperative agreement w/NM State Police, NPS, & local law enforcement		NM State Police has lead responsibility
	Develop search & rescue plan to include criteria under which vehicular or helicopter use will be allowed for life-threatening situations		Action plan will reduce unwarranted degradation
	Close trailheads to grazing, hunting & trapping		Incompatible activity in high use area
	Monitor to identify future areas of concentrated recreation use and evaluate for possible closure		
Protect wilderness resources & assure maintenance of primitive recreation opportunity	Develop questionnaire for gathering data on visitor experiences & perceptions		Primitive recreation experience dependent upon natural, social, & managerial setting
	Develop social limits of acceptable change for primitive recreation		
	Evaluate social limits of acceptable change annually using questionaire & random surveys		
	Implement an effective patrol program		Human use will impact wilderness resource
	Staff w/rangers for wilderness patrol		
	Train personnel in patrol techniques & use recource specialists & volunteers to assist in wilderness patrols		Degradation of wilderness resource will diminish primitive recreation experience

A comprehensive discussion of the overall Interpretive and Education program within the NCA (including the West Malpais Wilderness) is located in Chapter 9. The following prescriptions and actions are recommended to effectively protect the naturalness of the West Malpais Wilderness and to prevent its primitive recreation opportunities from diminishing.

RANGE MANAGEMENT

Management Objectives for Range Management

RANGE WILL BE MANAGED TO ALLOW GRAZING TO CONTINUE WHILE PROTECTING WILDERNESS VALUES, AND TO ACHIEVE AND CONSERVE DESIRED PLANT COMMUNITIES THAT BENEFIT LIVESTOCK AND WILDLIFE. MANAGEMENT WILL EMPHASIZE BALANCE BETWEEN RANGE MANAGEMENT NEEDS AND THE PROTECTION OF WILDERNESS, WILDLIFE HABITAT, AND PRIMITIVE RECREATION.

Current Situation

General Information: Parts of five range allotments fall within the West Malpais Wilderness Unit boundaries (refer to Table 5-7). At least two BLUs fall in each allotment, with a total of eight (refer to Table 5-8). The BLUs are correlated to ecological range sites (potential vegetative communities) by the soils component that they share. The vegetation component of the BLUs identifies the existing plant communities. Each BLU with its unique combination of terrain/landform, soils, vegetation/land cover, and surface drainage responds differently to management prescriptions and actions (refer to Table 1-5, Chapter 1). Map 5-4 shows the five allotments as they are situated relative to the West Malpais Wilderness Unit's boundaries, and the BLUs found in each.

The Malpais Allotment (previously the York Ranch Allotment) covers most of the West Malpais Wilderness Unit (refer to Table 5-7). This allotment and the Los Cerros Allotment support yearlong operations that require supplemental feeding during certain months and special maintenance of water facilities. All supplemental feeding occurs on privately owned inholdings within the West Malpais Wilderness.

TABLE 5-6
MANAGEMENT PRESCRIPTIONS AND ACTIONS
FOR INTERPRETATION AND PUBLIC EDUCATION

		Affected Environment	
Management Prescription	Action	Natural (BLUs)	Human
Implement interpretive objectives (refer to Interpretation & Educational Chapter 2) to enhance visitor experience & facilitate a positive wildland ethic	Develop onsite interpretive opportunity at Big Hole in the Wall trailhead (outside of wilderness boundary)	A	Information influences human behavior
	Use trailheads to distribute information on resource protection & user responsibilities		
	At trailhead include an interpretive theme of wilderness as a resource & wilderness test to emphasize low-impact use (pack-it-in, pack-it-out)		
	Develop environmental education programs for use at Ranger Station and in local community	All	Information will influence human behavior
	Develop wilderness brochure which includes map, safety information, & low impact use techniques		

TABLE 5-7
GRAZING ALLOTMENTS PARTIALLY LOCATED IN THE CONSERVATION UNIT

Allot-ment#	Allotment Name	No. of Pastures	Total AUMs Permitted*
200	Cerro Chato	1	2,448
201	Cerritos de Jaspe	3	2,916
203	Malpais	15	14,116
207	Cerro Brillante	7	3,600
210	Los Cerros	7	2,496

*Note: Figures represent total AUMs permitted for entire allotment, including areas outside the NCA.

All grazing allotments in the West Malpais Wilderness have been placed into one of three selective management categories. The purpose of this process is to focus management attention on those allotments where changes could produce cost-effective improvement in resource conditions.

All five allotments in the West Malpais Wilderness Unit fall into the "I" (Improve) selective management category. The allotments are in unacceptable ecological range condition and/or have significant resource conflicts. The criteria used to determine each allotment's selective management category are displayed in Appendix I.

Forage/Desired Plant Communities: Desired plant communities will be encouraged through range management practices that encourage natural ecological processes. The Rio Puerco RMP (USDI, BLM 1986) provides for implementation of changes in management techniques and/or reductions in allowable livestock grazing use on "I" category allotments. These measures could ensure improvement in ecological range condition, thus obtaining desired plant communities that provide forage needs for livestock grazing use and wildlife habitat, and improvement in watershed conditions. Improving the quality and quantity of forage is a recognized focus of livestock grazing management. Such improvement results from managing for a desired community of plant species and for species productivity.

Management techniques in the West Malpais Wilderness vary among allottees, and each allotment is likely to reflect a different combination of management practices that affect forage quality and quantity. Practices such as the amount of time and season that the range is grazed each year, the number of cattle grazed, feeding methods, the number of waters and their locations, the number of pastures in an allotment, and how cattle are moved between pastures all affect vegetation.

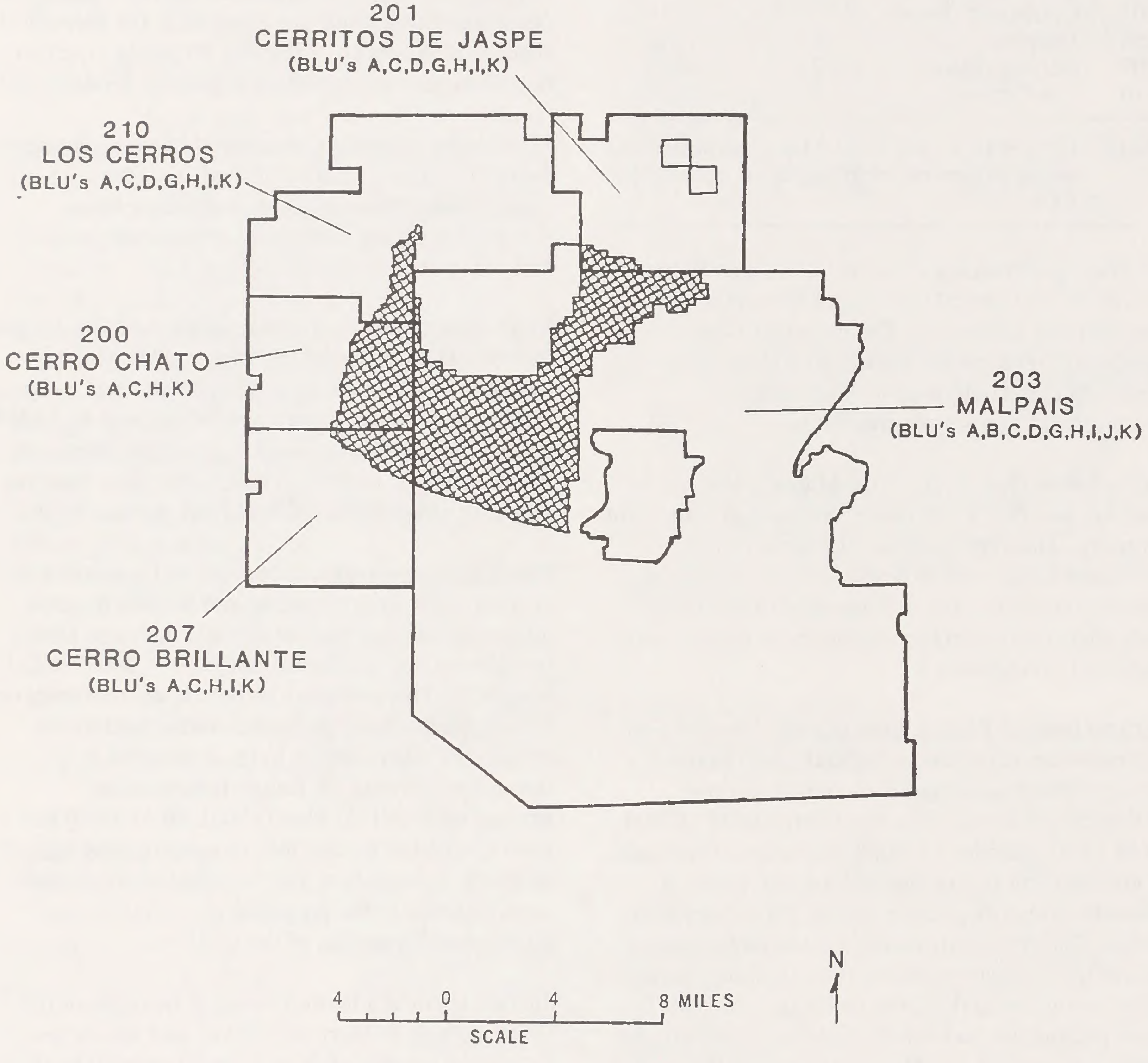
Fluctuations in precipitation amounts and time of occurrence also result in variations in the amount of vegetation produced. Likewise, trends in precipitation from year to year affect vegetative production.

Monitoring studies are conducted in each allotment every l to 5 years. Data collected from the studies supply information on plant production, cover, density, frequency, changes in species composition, and utilization.

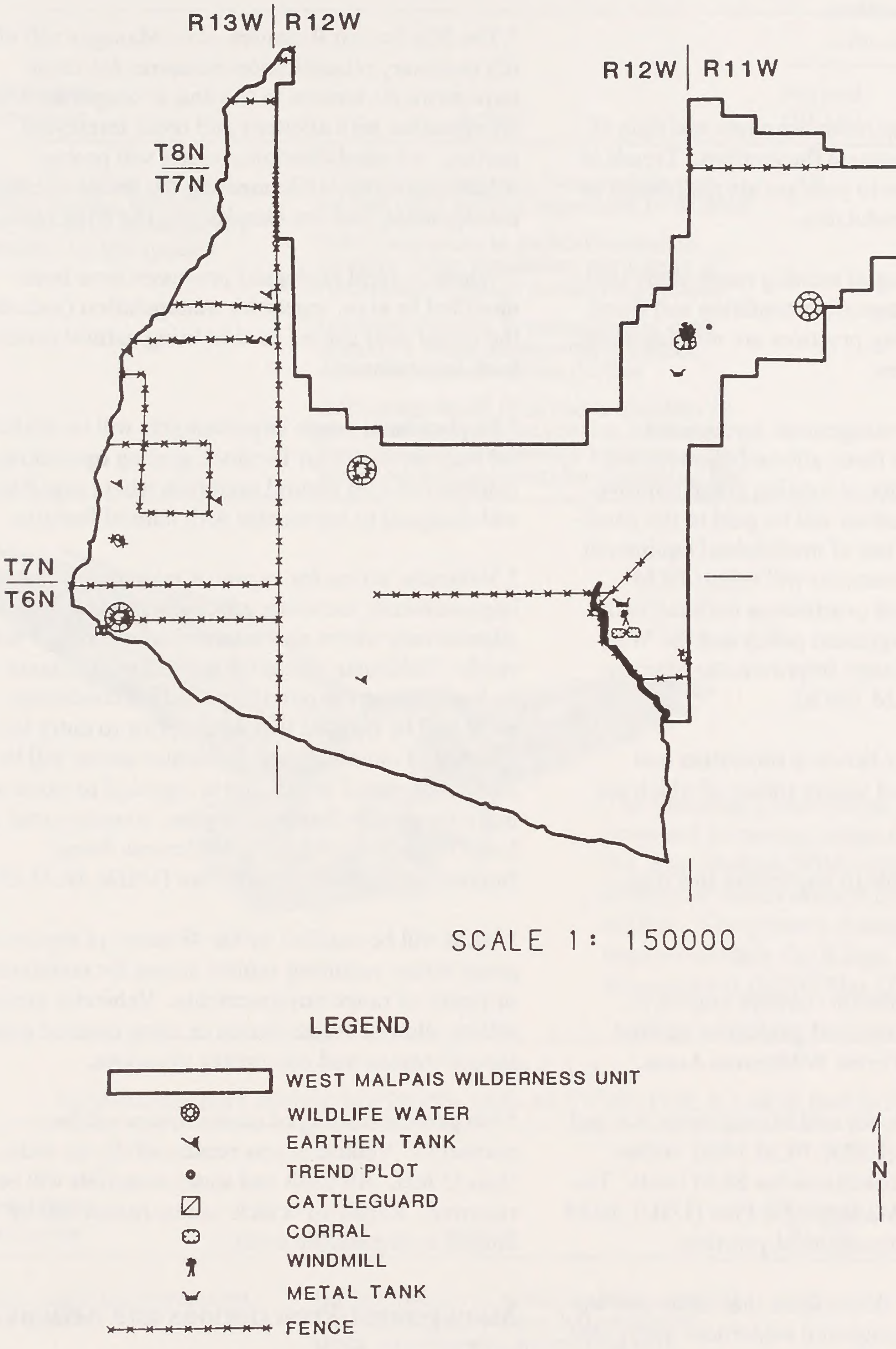
Vegetation monitoring studies began in West Malpais in 1985. Data collected by those studies became available in 1989. As data are collected and analyzed, management prescriptions and actions will be added as appropriate. Selection of key areas in allotment pastures will be needed to determine plant communities for range and wildlife habitat management.

Range Improvements: Inventory and inspection of existing range improvements and wildlife projects located within the West Malpais Wilderness Unit's boundaries was completed in October, 1988 (refer to Map 5-5). This inventory included improvements on private land inholdings located within wilderness boundaries where access to these properties is through wilderness. A Range Improvement Management (RIM) Plan (USDI, BLM 1990) has been completed for the five allotments using the inventory information, and recommendations have been included in the proposed prescriptions and actions for this section of the GMP.

Surface water is a limited resource throughout the West Malpais Wilderness. Developed waters are located on private lands within wilderness boundaries. Most are developed for livestock, but serve an important second role as wildlife waters. A list of waters is contained in the West Malpais Wilderness RIM Plan. No new waters are planned. An existing road to a well located on the Malpais Allotment was cherry-stemmed into the West Malpais Wilderness and forms part of the unit's southeastern boundary.



MAP 5-4
GRAZING ALLOTMENTS OVERLAPPING THE WEST MALPAIS WILDERNESS UNIT
IN RELATIONSHIP TO BIOPHYSICAL LAND UNITS.



MAP 5-5
RANGE IMPROVEMENTS IN THE WEST MALPAIS WILDERNESS UNIT

An antelope herd uses BLU A which covers nearly half of the West Malpais Wilderness Unit. Any augmentation of this herd could result in change of range management practices.

Assumptions

* Fluctuations in precipitation amounts and time of occurrence produce biomass fluctuations. Trends in precipitation from year to year are also important to trends in vegetative production.

* Continued monitoring of existing range study sites is essential to assess vegetation condition and trend, and determine if grazing practices are meeting range improvement objectives.

* A renegotiation of management agreements between BLM and the three affected allottees will address the maintenance of existing range improvements. Particular attention will be paid to the conditions under which the use of mechanized equipment would occur. The agreements will reflect BLM wilderness management practices as outlined in the BLM wilderness management policy and the West Malpais Wilderness Range Improvement Management Plan (USDI, BLM 1990b).

* Conflicts could occur between recreators and protection of developed waters (many of which are on private property).

* Funds will be available to implement this plan.

Policy

* The El Malpais legislation requires grazing to continue under Congressional guidelines entitled "Grazing in National Forest Wilderness Areas."

* The Federal Land Policy and Management Act and the Rio Puerco RMP (USDI, BLM 1986) outline grazing management conditions for BLM lands. The Range Improvement Management Plan (USDI, BLM 1990b) cites specific management practices.

* The Wilderness Act determined that cattle grazing will continue within designated wilderness where that use occurred prior to designation.

* The selective management category for any "I" category allotment will be changed as ecological conditions improve and resource conflicts are resolved, as documented by monitoring.

* Any adjustment to grazing levels will be considered through rangeland studies and environmental assessments.

* The Rio Puerco Resource Area Manager will identify necessary rehabilitation measures for range improvements located in the unit in cooperation and coordination with allottees and other interested parties. All rehabilitation projects will protect wilderness values while meeting the needs of range management, and are identified in the RIM plans.

* Where natural ecological processes have been modified by man, vegetative manipulation (including the use of fire) can be used to bring natural processes back into balance.

* Replacement range improvements will be evaluated for their necessity for livestock grazing operations, constructed with natural materials where possible, and designed to harmonize with natural features.

* Vehicular access for repair or maintenance of range improvements, including existing waters, will be allowed only where non-mechanical means are not viable. Vehicular access for normal maintenance will be limited to dry ground/dry weather conditions. BLM will be notified two weeks prior to entry for the purpose of maintenance. Vehicular access will be along designated routes and is expected to occur no more frequently than once a year. Access routes are listed in the West Malpais Wilderness Range Improvement Management Plan (USDI, BLM 1990).

* BLM will be notified within 48 hours of any emergency action requiring vehicle access for maintenance or repair of range improvements. Vehicular access will be allowed across frozen or snow covered ground for unforeseen and emergency situations.

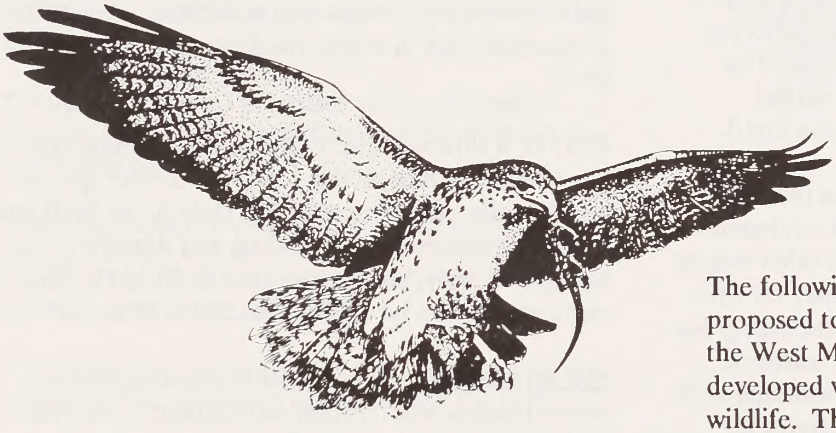
* No general blading of access routes will be permitted. Vehicle access routes will be no wider than 15 feet. All trash and waste materials will be removed. Repair to vehicle access routes will be limited to impassable areas.

Management Prescriptions and Actions

The following prescriptions and actions are proposed to encourage the forage/desired plant community through natural ecological processes.

TABLE 5-9
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR FORAGE/DESIRED PLANT COMMUNITIES

Management Prescription	Action	Affected Environment Natural (BLUs)	Affected Environment Human
Protect the range resource, enhance forage, increase cover, densitiy, & frequency of desired forage species	Maintain or improve forage while protecting plant species important to wildlife Select key areas in each allotment to monitor range condition; use Limits of Acceptable Change monitoring system Institute changes in management practices if or when monitoring indicates desired range condition decline Encourage small fires (no more than 20 acres) in areas where erosion of steep slopes is likely and where human activity has produced potential for damaging fire	All	Range management practices partly control forage condition



The following prescriptions and actions are proposed to manage range improvements within the West Malpais Wilderness. This includes developed waters utilized by both cattle and wildlife. The primary management tool for range improvements is the Range Improvement Management (RIM) Plan (USDI, BLM 1990b).

TABLE 5-10
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR RANGE IMPROVEMENTS

Management Prescription	Action	Affected Environment Natural (BLUs)	Affected Environment Human
Protect range improvements and livestock	Inform visitors of policies about camping near developed waters, harassing livestock, or otherwise interfering with grazing use	All	Recreators are attracted to developed waters
	Inform visitors of potential impacts that can occur when they alter fences, gates, water tanks, or windmills	All	Potential conflicts between recreation use and range management

WILDLIFE HABITAT

Management Objectives for Wildlife Habitat

CONSERVE DIVERSE WILDLIFE HABITAT TYPES IN THEIR NATURAL CONDITION WHILE PROVIDING VISITOR USE AND ACCESS, AND TO ALLOW NATURAL ECOLOGICAL SUCCESSION OF BIOLOGICAL POPULATIONS.

Current Situation

General Information: The West Malpais Wilderness Unit supports a variety of wildlife species. Very small patches of BLUs B, F, G, H, and I are scattered through the three major BLUs found in the unit, BLU A, C, and D. This pattern of habitats and the edges that occur between habitats increases the species diversity (refer to Map A and Table 1-4). A complete list of vertebrate species likely to occupy the West Malpais occupy is in Appendix C. The BLUs each species is found in and the habitat features important to that species are also listed.

Water is a limiting resource for game in the West Malpais Wilderness Unit. One rainfall catchment wildlife water is located in the unit. All other waters were developed primarily to provide water for livestock but also provide an important water supply for wildlife. Eleven earthen reservoirs are scattered throughout the unit. Two of the three windmill wells in the unit are located on private lands (refer to Map 5-5). The third windmill is on property previously owned by the state of New Mexico. It has been acquired by the BLM and is being managed as described in the RIM Plans.

Two wildlife exclosures located within wilderness boundaries to provide protected wildlife habitat are in good condition. No plans have been made to remove these exclosures while grazing continues.

Special Use Areas: Certain habitat types in the West Malpais Wilderness are especially important to wildlife because they are in limited supply, provide essential combinations of habitat factors during critical portions of a life cycle, or allow protected access to preferred habitats during seasonal migrations.

The grass-shrub rolling upland habitat of BLU A, which covers the southeastern half of the West Malpais Wilderness Unit, is the only habitat where pronghorn antelope, jackrabbits, cottontails, and a variety of birds including quail are found in the NCA. Soils in parts of BLU A are deep enough to support small burrowing mammals such as prairie dogs, which in turn supply food for raptors.

One of the key habitat features in this BLU are numerous playas which offer an ephemeral water supply that supplements developed waters. During certain times of the year they offer habitat for a variety of invertebrates, breeding grounds for amphibians, and attract migrating waterfowl.

BLU C, which covers the western third of the unit, is shrub-conifer rolling upland characterized by clumps of pinons and junipers scattered through shrubby meadows. This BLU offers large amounts of edge. It is attractive to mule deer, turkey, many species of birds, and provides cover for wildlife in times of severe weather. Pinons often produce heavy crops of nuts valued by visitors as well as wildlife. This BLU is especially rich in winter resident and migrating birds.

BLU D, a shrub-conifer rolling upland habitat that has ponderosa pine as the dominant conifer species on lava soils, covers most of Big Hole in the Wall and is attractive to mule deer, turkey, and Abert's squirrel. Rarely, elk are also seen in BLU D. The same species can be expected in BLUs H and G.

Species Management: The El Malpais legislation allows hunting and trapping to continue in the West Malpais Wilderness Unit. Federal regulations protect migratory birds and raptors; federal and state regulations protect special status species; and New Mexico Department of Game and Fish regulations control hunting seasons, numbers, and species of game taken.

The BLM conducts a public information and outreach program called "Operation Respect" within the West Malpais Wilderness annually during hunting season. This program is oriented toward assuring a positive and safe hunting experience for the recreator, and minimizing potential impacts to private and public lands and natural resources.

Assumptions

* The NM Department of Game and Fish (NMDG&F) and the BLM will cooperate in conducting a study on the feasibility of augmenting the

existing antelope herd with a transplant of antelope from another location.

* Wildlife viewing will increase as a popular recreation activity.

* Existing developed waters are critical to support existing wildlife populations.

* Interest in hunting and trapping within the West Malpais Wilderness will continue.

* Specific monitoring needs for determining the condition of habitats will be established.

* Funds will be available to implement this plan.

Policy

* BLM has a broad interest in protecting the habitat of all wildlife as part of its overall multiple use program outlined in Fish and Wildlife 2000, a BLM planning and policy document designed to guide wildlife management into the year 2000 (USDI, BLM 1988a).

* Natural ecological processes will be allowed to occur in the wilderness without human influence as much as possible.

* Specific monitoring needed for determining condition of habitats will be established as part of the Limits of Acceptable Change (LAC) monitoring system (refer to Appendix J).

* Wildlife developments will be maintained with the minimum tool necessary to accomplish the task.

* The El Malpais legislation mandates resource conservation in the NCA. BLM policy specifies responsibilities to provide food and habitat for wildlife in a variety of ways for a variety of habitat types.

* The Federal Land Policy and Management Act (FLPMA) and the Rio Puerco Resource Management Plan (RMP) outline range and wildlife management policies for the El Malpais NCA.

* BLM wilderness management policy limits vegetative manipulation to those actions necessary to restore natural ecological processes affected by human interference.

* The NMDG&F Operations Plan (1987-1995) suggests habitat management for certain species that occur in the West Malpais Wilderness Unit.

* The BLM Range Improvement Management Plan (USDI, BLM 1990b) cites specific management policies for waters in the West Malpais Wilderness Unit.

* NMDG&F manages hunting seasons for antelope, mule deer, dove, quail, squirrel, waterfowl, and turkey. Wilderness policy requires that hunts occur on foot or from horseback.

* All studying and monitoring of wildlife and their habitats will be accomplished by non-motorized and non-mechanical means.

* The preservation of sensitive or special status species habitat dependent on wilderness conditions will be favored.

Management Prescriptions and Actions for Wildlife Habitat Management

Table 5-11 describes the prescriptions and actions proposed to protect wildlife special use areas in limited supply.

Table 5-12 describes the prescriptions and actions proposed to protect all wildlife in the West Malpais Wilderness and to manage populations of species regulated by the NMDG&F.

TABLE 5-11
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR SPECIAL USE AREAS

Management Prescription	Action	Affected Environment	
		Natural (BLUs)	Human
Prevent human impacts to areas occupied by wildlife for breeding, birthing, migration, cover, & winter use	Survey to identify these areas before conflicts occur between humans & wildlife Design management strategies to deter conflicts before they occur	All	Consider sensitive areas when creating trails; redirection of recreators may be necessary
Prevent human impacts to wildlife during sensitive times of their life cycles (birthing, breeding, migration, winter use)	Survey to determine sensitive times & locations for such activities before conflicts occur between humans & wildlife	All	
Protect all drainages & playas	Manage these areas as sensitive riparian habitat Establish cooperative agreements w/allottees to limit cattle access	AB	Potential conflicts between habitat management & range management Wildlife attracted to playas may attract visitors
Protect identifiable special use sites	Deter destruction of identifiable special use sites such as raptor aeries, snake dens, mammal burrows, wildlife trees, & down rotting logs	All	May need to educate allottees & recreators about special use sites
Protect patchwork pattern of habitats & their natural evolution	Develop fire plan that allows fire to fill its natural role		

TABLE 5-12
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR REGULATED SPECIES MANAGEMENT

Management Prescription	Action	Affected Environment	
		Natural (BLUs)	Human
Manage populations of species regulated by the NMDG&F	Continue to provide input to NMDG&F regarding hunting & trapping in the NCA. Manage forage & browse condition to support specifed population sizes of species regulated by NMDG&F as stated in Operations Plan (1987-1990)	All	Hunting attracts many visitors to the area each year; antelope, turkey, dove, quail, & waterfowl, & Aberts squirrel are hunted
Protect all wildlife	Provide visible presence in area by patrolling borders of unit to deter poaching & other unlawful taking	AC	
	Continue "Operation Respect"	All	
	Maintain existing livestock & wildlife waters		

TABLE 5-12 -- CONCLUDED

Management Prescription	Action	Affected Environment Natural (BLUs)	Affected Environment Human
Protect habitat of songbirds, insectivorous birds, raptors, & threatened & endangered species	Provide educational material to the public about these resources	All	Visitors are attracted to areas offering diversity of wildlife
Consider augumenting the existing antelope hered in West Malpais Wilderness	Establish a cooperative agreement w/NMDG&F Negotiate necessary range management changes w/allottees	A	Reintroduced species may compete w/livestock for some resources
Protect hole nesting wildlife	Deter the cutting of dead standing trees	CD	

SCIENTIFIC STUDY

Management Objective for Scientific Study

ALLOW RESEARCH TO OCCUR AS LONG AS IT IS CONDUCTED IN SUCH A MANNER TO PROTECT AND PRESERVE THE WILDERNESS CHARACTER IN ITS NATURAL CONDITION SUBJECT TO NATURAL ECOLOGICAL PROCESSES.

Current Situation

__Research and Data Collection__: The West Malpais wilderness contains opportunities for scientific study and data gathering in an outdoor laboratory setting for those projects requiring a dynamic natural environment. Range conservationists and wildlife biologists are presently monitoring vegetation conditions. Two wildlife seeding exclosures are being monitored. A study conducted by the US Forest Service Rocky Mountain Experimental Station has been collecting data on forage condition since 1985.

Assumptions

* Permit applications for scientific study in the West Malpais Wilderness may be received.

* Implementing the concept of a Field Learning Center (refer to Chapter 3, "Mertz Ranch Site," and Chapter 9, "Interpretation and Education") will facilitate scientific study objectives. This could provide data that would help assure that the West Malpais Wilderness retains its natural character, suject to natural processes.

* The demand for basic research in the wilderness may increase due to the unique research opportunities provided by a legislatively protected area where the functioning of natural ecological processes is emphasized. This may include biological and/or social research.

* Funds will be available to implement this plan.

Policy

* Scientific study involving extraction of materials or surface-disturbing activities (e.g., excavation, surface collection, stabilization) will be analyzed on a case-by-case basis.

* Scientific study involving non-consumptive/non-extractive data collection will be monitored closely to achieve conformance with the objective stated above.

* All projects must be conducted without the use of motorized vehicles, mechanized equipment, or facilities unless expressly authorized when no other reasonable alternative exists. If such use is approved, it must be the minimum necessary and must not degrade the wilderness resource.

* All requests for scientific study and data collection will be analyzed in an environmental assessment. All proposals for scientific study will:

- Provide information on specific location (with maps), timeframes, detailed description of proposed action and a reclamation plan. Locality information will be kept confidential when possible.

- Provide for detailed recordation, reports, care of specimens, and availability of information to the public, specialists, scientists, and institutions.

- Address similar information or material available for study in existing collections.

* Authorized material collection of wilderness resources must be conducted in an inconspicuous manner and not be visually evident to the casual observer.

* Permanent or temporary study plots or structures must be inconspicuous and not be visually evident to the casual observer.

* Provide administrative aid (staff time and funding) when possible and process requests for projects within 120 days of receipt.

Management Prescriptions and Actions

The following prescriptions and actions are proposed to maintain and monitor existing studies, and to encourage research and data collection when it facilitates wilderness goals and objectives.

TABLE 5-13
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR
SCIENTIFIC RESEARCH AND DATA COLLECTION

		Affected Environment	
Management Prescription	Action	Natural (BLUs)	Human
Continue range and wildlife habitat studies in West Malpais Wilderness	Maintain and monitor existing study plots Evaluate study plots for conformance to requirement of not being visually evident to the casual observer Modify design if VRM Class I standards are not met	ACDG	BLM resource specialists will continue to gather resource information
Encourage scientific research in the West Malpais Wilderness when it facilitates wilderness goals & objectives	Develop cooperative agreements w/teaching & research institutes to conduct studies Develop an efficient & responsive permitting system for research proposals in West Malpais Wilderness Encourage establishment of a Field Learning Center (refer to Chapter 3 & Chapter 9) Divert research not dependent on the wilderness setting to other portions of the Conservation Area, or outside of the NCA Develop agreements w/ research institutes to conduct studies on social, biological, geomorphic, and geologic processes which aid in identifying & mitigating human caused changes	All	Data collection & analysis can expand understanding of natural & human systems

CULTURAL RESOURCES

Management Objectives for Cultural Resources

CULTURAL RESOURCES WILL BE MANAGED WITH AN EMPHASIS ON FUTURE SCIENTIFIC USE. CULTURAL RESOURCES WILL BE MANAGED TO CONSERVE THEM IN A STABLE CONDITION FOR FUTURE USE FOR AS LONG AS POSSIBLE.

Current Situation

General Information: Little archeological information is available for the West Malpais Wilderness Unit. At present only 324 acres, or about .8 percent of this unit has been inventoried for cultural resources. Only one archeological site has been recorded, a herding camp which dates no earlier than about 1930. Undiscovered artifact scatters and other historic sites related to livestock operations undoubtedly exist in the West Malpais Wilderness Unit, but generally very low site densities are expected.

No cultural resources in this unit are being actively managed by the BLM at this time. Relatively low site densities are expected in the West Malpais Wilderness and most sites will probably not have substantial buried materials or architectural features. Because of this, the principal threat to cultural resources within this unit is illegal surface collection.

Vandalism and Surface Collection: Surface collection is a potentially serious problem in this unit. This is true because ground surfaces are stable and most artifacts will be exposed on the surface, rather than buried. Vandalism is considered less of a problem in the West Malpais Wilderness than elsewhere in the NCA because most sites are expected to consist of prehistoric artifact scatters with little or no buried material or historic camps without architectural features. Nevertheless, it is conceivable that unanticipated sites which are vulnerable to vandalism could be found.

Natural Deterioration: Cultural resource sites within the West Malpais Wilderness are expected to be in relatively stable condition. However, very little inventory is available for this unit and the actual extent of natural deterioration is not known.

BLM Authorized Actions: BLM actions and actions authorized by the BLM can have important effects on cultural resources, and it is critical that the BLM carefully consider these effects, particularly because of the special mandate to protect archeological and historical values in El Malpais. Because of this mandate, the management prescriptions and actions under this element reflect a more careful, conservative approach then usually applies on multiple use lands.

Interpretation and Public Education: An important aim of the public education initiative in the GMP is the development of a positive land ethic, particularly with regard to cultural resources. Because so few cultural resources are known in this unit, actions proposed under this issue emphasize measures which are not site-specific.

Assumptions

* Most sites will be managed to preserve their potential for scientific investigation.

* Site densities are low and most sites will not have buried materials or architectural remains.

Policy

* One principal objective of the El Malpais legislation is to protect archeological resources, with special attention to enforcement of the Archeological Resources Protection Act and the National Historic Preservation Act.

* The El Malpais legislation also mandates a continuing program of public education and interpretation about the resources of the NCA, including cultural resources.

* Wilderness areas will be managed so as to preserve their overall wilderness character.

* Cultural resources authorizations within wilderness will be allowed, if they are carried out in a manner that will not degrade wilderness values.

* Wilderness designation does not relieve the BLM of its affirmative cultural resource management responsibilities. However, it is recognized that the manner in which cultural resources will be managed is different within wilderness areas in that approved actions also may not adversely affect the overall wilderness character.

* All approved actions within wilderness areas are still subject to normal Section 106 clearance procedures, in accordance with the National Historic Preservation Act.

* Administration of these policies is presented in more detail in the New Mexico Manual Supplement, "Cultural Resource Management within Designated Wilderness Areas."

Management Prescriptions and Actions

Table 5-14 presents the prescriptions and actions proposed to minimize the occurrence of vandalism and surface collection.

TABLE 5-14
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR VANDALISM AND SURFACE COLLECTION

		Affected Environment	
Management Prescription	Action	Natural (BLUs)	Human
Aggressively enforce ARPA by enhancing probability of catching & successfully prosecuting violators	Establish & publicize rewards for information leading to arrest & conviction of ARPA violators	All	Increasingly, ARPA violators are professional criminals who loot sites for profit
	Ensure ARPA training for law enforcement personnel & other key field personnel	All	ARPA enforcement requires specialized training
Identify sites & areas vulnerable to & affected by vandalism & surface collection	Increase level of Class II inventory to 5% of unit (1,661 acres of new Class III survey)	DFG	Resources vulnerable to surface collection should be identified
	Through aerial photointerpretation, review of existing records, & reconnaissance, record & photodocument any homesteads w/in unit	All	Baseline information needed to support prosecution for vandalism

Table 5-15 describes the prescriptions and actions proposed to minimize the damage from soil erosion, now impacting 83 percent of the Cebolla Wilderness Unit's cultural resources.

TABLE 5-15
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR NATURAL DETERIORATION

		Affected Environment	
Management Prescription	Action	Natural (BLUs)	Human
Identify sites & areas vulnerable to & affected by natural deterioration	Increase level of Class II inventory to 5% of unit (1,661 acres of new Class III survey), emphasizing information about site condition	DFG	Important scientific & perhaps interpretive values being lost w/out BLM knowledge
	Through aerial photointerpretation, review of existing records, oral history, & reconnaissance, record & photodocument any homesteads w/in unit	All	Potential interpretive properties should be identified & factors affecting their condition evaluated

Table 5-16 describes the prescriptions and actions proposed to assure that the BLM considers the potential effects on cultural resources from all BLM authorized actions.

TABLE 5-16
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR BLM AUTHORIZED ACTIONS

Management Prescription	Action	Affected Environment: Natural (BLUs)	Affected Environment: Human
Preserve long-term potential of sites for scientific use	Restrict research involving collection or excavation at non-threatened sites (refer to Chapter 13)	All	Research can destroy or diminish scientific potential
	Avoid cultural resources rather than mitigating development and use-related impacts	All	
	Inventory at least a 1/4-mile radius around proposed visitor-use developments such as trailheads, considering potential secondary impacts	All	Cumulative impacts of casual collection by visitors can severely damage cultural resources

Table 5-17 presents the prescriptions and actions proposed to help develop a positive natural resource ethic towards cultural resources.

TABLE 5-17
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR PUBLIC INTERPRETATION AND EDUCATION

Management Prescription	Action	Affected Environment: Natural (BLUs)	Affected Environment: Human
Maintain continuing program of interpretation & public education about cultural resources in NCA (refer to Chapter 9, I & E Summary)	Present cultural resources in exhibits in Multiagency Center & BLM Ranger Station	All	Information can influence human behavior
	Incorporate cultural resources into environmental education programs given at schools		

NATIVE AMERICAN ISSUES

Management Objectives for Native American Issues

ENSURE ACCESS FOR TRADITIONAL NATIVE AMERICAN CULTURAL PRACTICES, ENSURE PRIVACY AND RESPECT FOR THOSE PRACTICES, AND FOSTER AN ATMOSPHERE OF COMMUNICATION AND COOPERATION WITH LOCAL AMERICAN INDIAN GROUPS.

Current Situation

Native American Concerns: No specific information is presently available about American Indian traditional uses in the West Malpais wilderness. However, there is reason to believe that such uses may take place. Small areas of recent lava flows are within the West Malpais Wilderness area. Such "black rock area," as it is known to the Navajo people, is important because it is mentioned in the Navajo curing ceremony Monsterway. These lava flows are the hardened blood of Yeitso, the chief of the enemy Yei, who was killed by the Hero Twins near Mt. Taylor.

Areas important to Ramah Navajo religious practices are known to occur within the National Monument adjacent to the West Malpais Wilderness. The most convenient access to these areas used to be through the area now designated as wilderness. However, alternative access routes do exist through the National Monument.

In accordance with the wishes of Native American groups, the BLM does not actively manage any sites or areas for traditional Native American uses. Instead the BLM seeks to keep Native American groups informed about major activities proposed in El Malpais, giving them time to react if traditional uses are likely to be affected.

Native American Concerns: A diversity of deeply rooted cultural traditions is one of the special characteristics which New Mexico offers. In addition to enriching the lives of its citizens, this cultural diversity is one of the cornerstones of New Mexico's tourist industry.
Congress made it clear in the El Malpais legislation that it expects the NCA, including the West Malpais Wilderness, to be managed in ways which accommodate the needs of traditional American Indian peoples and which allow the continuance of traditional cultural practices.

Assumptions

* Historical Native American uses of El Malpais have been gradually displaced over the past four centuries.

* Important Native American uses of El Malpais do occur, particularly uses involving religion and traditional cultural practices.

* Religious and other traditional cultural practices often require privacy and extreme secrecy. Even speaking of some places can be a form of desecration.

* Continuous communication and interaction with Native American groups are necessary in order to maintain the personal relationships which provide a basis for trust and mutual respect.

Policy

* PL 100-225 requires close consultation with Native American groups during the planning process.

* PL 100-225 requires that access for continued traditional cultural purposes be allowed, and allows the temporary closure of special areas to ensure privacy.

* The American Indian Religious Freedom act requires federal agencies to consider the effects of their actions upon the practice of traditional Native American religions.

Management Prescriptions and Actions

The following prescriptions and actions are proposed to accommodate the needs of Native American peoples and allow the continuance of traditional cultural and religious practices.

TABLE 5-18
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR NATIVE AMERICAN CONCERNS

Management Prescription	Action	Affected Environment Natural (BLUs)	 Human
Protect continued use of the unit by Native Americans	Avoid placing public use facilities in sensitive areas	All	
	Use trail placement & other design factors to direct visitor use away from identified sites of religious or traditional cultural activities	All	
Encourage respect for Native American viewpoints	Protect Native American interests over long term by continued consultation & liaison w/interested local Indian tribes		
	Develop interpretive materials in cooperation w/interested local Indian tribes		
	Conduct cultural sensitivity training for law enforcement & other key field personnel		
Reaffirm equal employment opportunity for Indian people in NCA staffing	Target law enforcement position for Native American hire		
	Target interpretive specialist position for Native American hire		

Section 6
West Malpais Wilderness Unit Environmental Assessment

INTRODUCTION

This section represents an analysis of the effects to the environment that would result from implementing the preferred and low change alternatives. Refer to Chapter 1 for a description of the low change alternative and to Chapter 2 for a description of the actions proposed for the West Malpais Wilderness Unit under the preferred alternative. A complete description of the affected environment in the National Conservation Area is in Chapter 1. Chap-ter 2 and Appendix G provide a detailed summary of consultation and public input.

ENVIRONMENTAL CONSEQUENCES OF THE PREFERRED ALTERNATIVE

In general, prescriptions developed under the preferred alternative would maintain wilderness character and assure that natural ecological processes be allowed to operate freely with a minimum of human interference. Recreational use of the West Malpais Wilderness would be accommodated with a focus on visitor management and interpretation and education. Primitive and unconfined recreational opportunities would be maintained. To manage wildlife habitat, the BLM would emphasize the conservation of diverse habitat types in their natural condition and the natural ecological succession of biological populations. Range resources would be managed to provide for the continuation of grazing while protecting wilderness values and natural resources. Forage condition and the range improvements and water supply that range management relies on would be maintained. Cultural resources in the West Malpais Wilderness would be managed with an emphasis on future scientific use and, to a lesser extent, managed for future and current public use. Native American uses of the West Malpais Wilderness Unit would be continued with an emphasis on ensured access. Privacy and respect for traditional cultural resource practices and improved communication and cooperation with local Native American groups would be continued.

Impacts to Naturalness

The West Malpais Wilderness Unit was designated through the El Malpais legislation. The area exhibits qualities of naturalness and solitude, as well as ample opportunity for primitive and unconfined recreation. Human impacts in the unit are rare, and the area is rich in supplemental values. Prescriptions designed to protect naturalness focus on restoration of impacts to naturalness that have occurred from authorized and unauthorized actions over the past 50 years, and on prevention of new impacts.

Under the preferred alternative, naturalness would be retained and protected over the long term. The existing natural character, the opportunities for solitude, and primitive recreation, and supplemental values of diverse productive wildlife habitat, cultural resources, and visual qualities would be maintained.

In conclusion, prescriptions designed to maintain naturalness would assure protection of natural ecological systems. Human interference would be minimized and would be allowed only where manipulation is necessary to bring ecosystems back into natural balance where man has disturbed natural cycles. Protection of naturalness concerns are supplemented by wildlife, range, and cultural resource prescriptions.

Impacts to Recreational Use

The 39,600-acre West Malpais Wilderness Unit provides opportunities for primitive and unconfined recreation.

Some zones in the unit are readily accessible from upgraded roads. Overnight use is expected to be more frequent in the West Malpais Wilderness than the Cebolla Wilderness. Visitor use is expected to increase over the next 10 years probably leading to increased demand for visitor services and increased impacts to natural and cultural resources. Specific prescriptions designed to provide recreational use of the West Malpais Wilderness focus on visitor management and interpretation and education.

Visitor management prescriptions would direct and monitor recreational use at sites in the West Malpais Wilderness which are already heavily used (such as areas along CR 42) and sites where use is anticipated to increase (such as the Cerro Encierno Road and other areas where NPS is proposing developments; just north of the West Malpais Wilderness). Visitor use would be monitored to address future recreational need within high-use zones. Implementation of visitor management prescriptions would maintain primitive and unconfined recreation opportunities.

Visitor use data would be collected to ensure that wilderness character is preserved. Facilities to accommodate visitor use such as trails would be constructed only if resource damage is threatened. Limiting facility development to locations outside of wilderness boundaries would provide visitors a natural setting. Information and education would be provided to visitors to enhance visitor understanding of natural and cultural resources and preserve wilderness character by influencing human behavior.

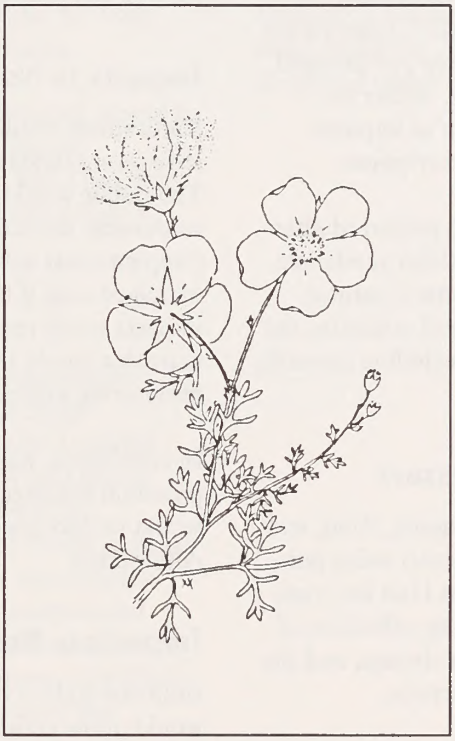
In conclusion, recreational use would be accommodated at existing heavily used sites. Visitor use would be monitored throughout the unit and actively managed only where resource damage was threatened or damaged. No facilities would be developed for visitor convenience or comfort within wilderness boundaries. Facilities would be designed to provide maximum protection to wilderness character and to natural and cultural resources.

Impacts to Range Management

Range resources would be managed to provide for the continuation of grazing while protecting wilderness values, natural resources, and the wildlife habitat found there. Forage condition and the range improvements and water supply that range management relies on would be maintained. Prescriptions for range management focus on forage condition, range improvements, and water availability.

Forage condition would be maintained at level or increasing trends resulting in long-term improvement in vegetation condition. Adjustments in grazing management could be necessary to improve forage on four allotments. Adjustments could include the development and implementation of grazing management systems and construction of range improvements.

Range improvements such as fences, watering devices, and/or erosion control measures would be constructed only where needed to restore natural ecological processes. Existing range improvements would be maintained to prevent the range resource from degrading. Range improvement maintenance under wilderness management policy is addressed in the draft West Malpais Wilderness Range Improvement Management Plan (RIM) and Environmental Assessment (USDI, BLM 1990). The RIM plan addresses how allotment operators and the BLM will coordinate the maintenance of existing range improvements. Particular attention would be paid to the conditions under which the use of mechanized equipment could occur.



The West Malpais Wilderness Management Plan recommends that a continued water supply for livestock be provided by allowing access by allottees for maintenance purposes. Allottee access for range improvement is also addressed in the RIM plan.

In conclusion, range resources would benefit from the implementation of the preferred alternative by providing for the improvement of forage condition and trend, maintenance of existing range improvements including water, and the development of additional improvements where necessary to maintain natural ecological processes.

Impacts to Wildlife Habitat Management

Prescriptions developed for wildlife habitat management emphasize the conservation of diverse wildlife habitat types in their natural condition while providing visitor use and access.

Natural ecological succession of biological populations would be emphasized. Prescriptions developed for wildlife habitat focus on water availability, forage and browse condition, special use areas, and species management.

Under the preferred alternative, existing developed waters (13 sites) would be maintained and other sites with water under private ownership would be proposed for acquisition or management under cooperative agreement. Forage and browse condition would be maintained on five allotments. Two wildlife seeding exclosures would remain in the unit to provide protected, high quality habitat for wildlife. The unit would be inventoried to determine special use sites to protect wildlife during sensitive times (such as nesting season) and in sensitive areas from interactions with humans. Those sites, once discovered, would be protected from disturbance.

Portions of the unit would be studied to determine the capability of the unit to support additional antelope and determine potential resource conflicts. The study would focus on water availability, fawning ground location, cover and forage type, and presence of range management facilities. Cattle grazing management and potential conflicts would be considered.

In conclusion, wildlife habitat would be maintained in its present condition to support the existing diversity of wildlife species (with the exception of possible reintroduction of desert bighorn sheep). Natural ecological succession of wildlife species would be maintained with an emphasis on protection of special use areas.

Impacts to Cultural Resources

Cultural resources in the West Malpais Wilderness would be managed with an emphasis on future scientific use and, to a lesser extent, managed for future and current public use. Little archeological information is available for the West Malpais Wilderness Unit. At present, only about 0.8 percent of this unit has been inventoried for cultural resources. Very low site densities are expected. The principle threats to cultural resources in the West Malpais Wilderness Unit are vandalism and surface collection, natural deterioration, and conflicts with other resource uses.

Prescriptions designed to protect cultural resources in the West Malpais Wilderness are essentially the same as prescriptions described for the Conservation Unit – except sites and acreage figures are changed to reflect differences in the two units. Refer to Section 4, Chapter 3 for a description of impacts associated with cultural resource prescriptions.

In conclusion, implementation of the preferred alternative for cultural resources could inhibit vandalism, curb surface collection of artifacts, retard natural deterioration of cultural resources, and minimize the impact of BLM-authorized actions including scientific study.

Impacts to Native American Issues

Local Native Americans (Acoma, Laguna, Zuni, and Navajo) have historically or are currently using portions of the West Malpais Wilderness Unit for traditional and religious purposes including collection of plant materials, use of some areas as shrines, and the continuation of livestock grazing practices.

Prescriptions designed to address Native American concerns are exactly the same for the West Malpais Wilderness Unit as those described for the Conservation Unit. Therefore, impacts associated with implementation of the preferred alternative are the same as impacts to Native American Issues already described in the Conservation Unit environmental consequences discussion in Chapter 3, Section 4.

In conclusion, implementation of the preferred alternative would ensure access for traditional Native American cultural practices, ensure privacy and respect for those practices, and foster an atmosphere of communication and cooperation with local American Indian groups.

ENVIRONMENTAL CONSEQUENCES OF THE LOW CHANGE ALTERNATIVE

The Low Change Alternative is an alternative to the proposed plan. The Low Change Alternative contains only the minimum changes to the existing environment and existing management that would be necessary to meet the intent of the El Malpais legislation. In most cases, the Low Change Alternative is a reflection of existing conditions in the NCA and is a description of how the BLM is managing the NCA before the GMP is approved.

As does the Preferred Alternative, the Low Change Alternative presents management prescriptions for each of the planning issues.

Impacts to Naturalness

Naturalness would be protected primarily through indirect methods under the Low Change Alternative. The public would be provided information about the wilderness resource through off-site interpretation. Supplemental wilderness resource values would be managed only if threatened. Additional adverse impacts could result from illegal or unauthorized activities due to the lack of or reduced levels of monitoring and enforcement.

In conclusion, naturalness would be maintained but potential enhancement opportunities for wilderness would be foregone under the Low Change Alternative.

Impacts to Recreational Use

Implementation of the Low Change Alternative would allow maintenance of existing recreational opportunities. Development of facilities would be provided only when damage to wilderness resources was highly probable as a result of increased visitor use. Areas threatened by public use would be closed to visitor access to protect resources. Public information and education would be provided off-site without coordination with research and teaching institutes. Recreational objectives described in the RMP for this area could be carried out.

The recreational experience of visitors associated with wildlife viewing, visual resources, and experiencing other resource values would be maintained.

In conclusion, recreational use of the West Malpais Wilderness would be concentrated and restricted to areas along CR 42, and other recreational use would be maintained unless visitor use threatened wilderness resources.

Impacts to Range Management

The Low Change Alternative would continue to emphasize range management of 5 allotments. Development of water and other range improvements would be possible on those allotments only if resource damage were occurring. Maintenance of existing range improvements would be accommodated through the RIM plan. Conflicts with other resource users such as recreational use could increase without an interpretation and education program. Other impacts to range would be similar to those described under the Preferred Alternative.

In conclusion, forage condition for livestock would be maintained in its existing condition. Range improvements would be maintained, and a minimum of new improvements would be developed only if resource conditions were threatened.

Impacts to Wildlife Habitat

Implementation of the Low Change Alternative would allow the presence of existing habitat improvement facilities (2 exclosures and 1 rainfall catchment). Critical wildlife waters would not be acquired or managed cooperatively with the landowner. Conflicts with grazing use could increase in critical areas especially near water development with maintenance of current grazing systems and range improvements. A supplemental transplant of antelope would not occur. Other impacts to wildlife would be similar to those described under the Preferred Alternative.

In conclusion, implementation of the Low Change Alternative could cause a reduction in existing habitat diversity and current population levels. Natural ecological succession would continue.

Impacts to Cultural Resources

For cultural resources, the Low Change Alternative is one that minimizes changes in the existing condition of the NCA's cultural resources. Therefore, the Low Change Alternative consists of the strongest, most aggressive management actions to ensure little change in the resources. Under this alternative, the BLM would implement stronger prescriptions for the long-term protection and interpretation of archeological and historic properties in the West Malpais Wilderness Unit.

In conclusion, implementation of the Low Change Alternative would result in stronger actions to protect cultural resources, resulting in increased horseback or hiking patrol and surveillance, higher levels of inventory on more acres, and more erosion control projects than actions described in the Preferred Alternative.

Impacts to Native American Issues

Impacts to Native American concerns would be the same under the No Action Alternative as those described under the Preferred Alternative.

CHAPTER 6

Chain of Craters Wilderness Analysis Report

Chapter 6
Chain of Craters
Wilderness Analysis Report/Environmental Assessment

Section 1
General Description

LOCATION

The Chain of Craters Wilderness Study Unit is located within the western portion of the El Malpais National Conservation Area (NCA) in north-central Cibola County, approximately 26 air miles southwest of San Rafael, New Mexico (refer to Map 6-1). The unit is situated along the western edge of the North Plains, a topographically closed basin.

The U.S. Geological Survey topographic maps for the unit are the Cerro Alto, Cerro Brillante, Cerro Hueco, and Goat Hill quadrangles. All of these are New Mexico quadrangles at the 7 1/2-minute scale.

CLIMATE AND TOPOGRAPHY

The Continental Divide crosses the northern and central portions of the Chain of Craters Unit. Topographic relief is created by numerous cinder cones that rise over a high plain. The highest point, Cerro Chato, reaches an elevation of 8,247 feet in the center of the unit. A natural, closed basin at the southern end of the unit occurs at an elevation of 7,380 feet. Maximum relief is approximately 867 feet.

Precipitation averages 12 inches annually, with the majority occurring in July and August. The driest months are generally May and June. Winters are rather cold, summers are warm, and days are sunny. Daily temperatures vary by 30 to 40 degrees. The average temperature for the warmest month (July) is about 70 degrees Fahrenheit, and for the coldest month (January) is about 32 degrees Fahrenheit (Roybal, et al. 1984).

LAND STATUS

The Chain of Craters Unit contains approximately 18,300 acres of publicly owned surface estate administered by the Bureau of Land Management (BLM). No private surface estate exists within the unit, but approximately 8,960 acres of subsurface are privately owned (refer to Map 6-2).

The private subsurface contained within the unit is scheduled for acquisition through exchange by 1991. The BLM has successfully completed two mineral exchanges with the holder of these private minerals; acquisition of the mineral estate will consolidate surface and subsurface estate under public domain. (Refer to Appendix B for a summary of the BLM Land Protection Plan, which discusses these and other ways of protecting the land in the NCA).

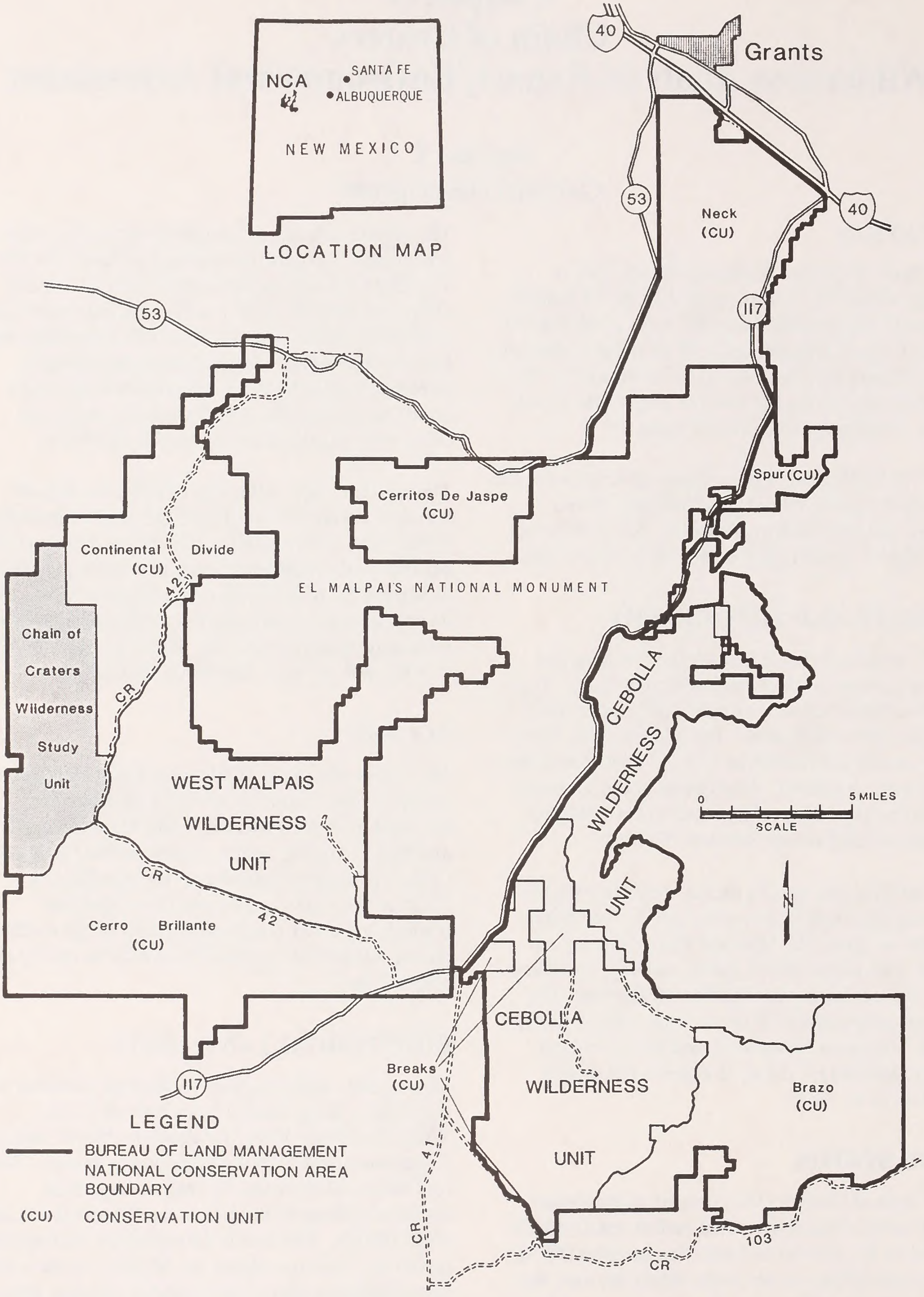
The western edge of the unit borders the Ramah Navajo Reservation and forms the western boundary of the NCA. Private tracts are scattered just outside of other unit boundaries. A quarter-section of land in Section 28, which borders the Chain of Craters on its northeast boundary, has been subdivided and contains approximately 600 lots. However, the subdivision has not yet been extensively developed.

ACCESS

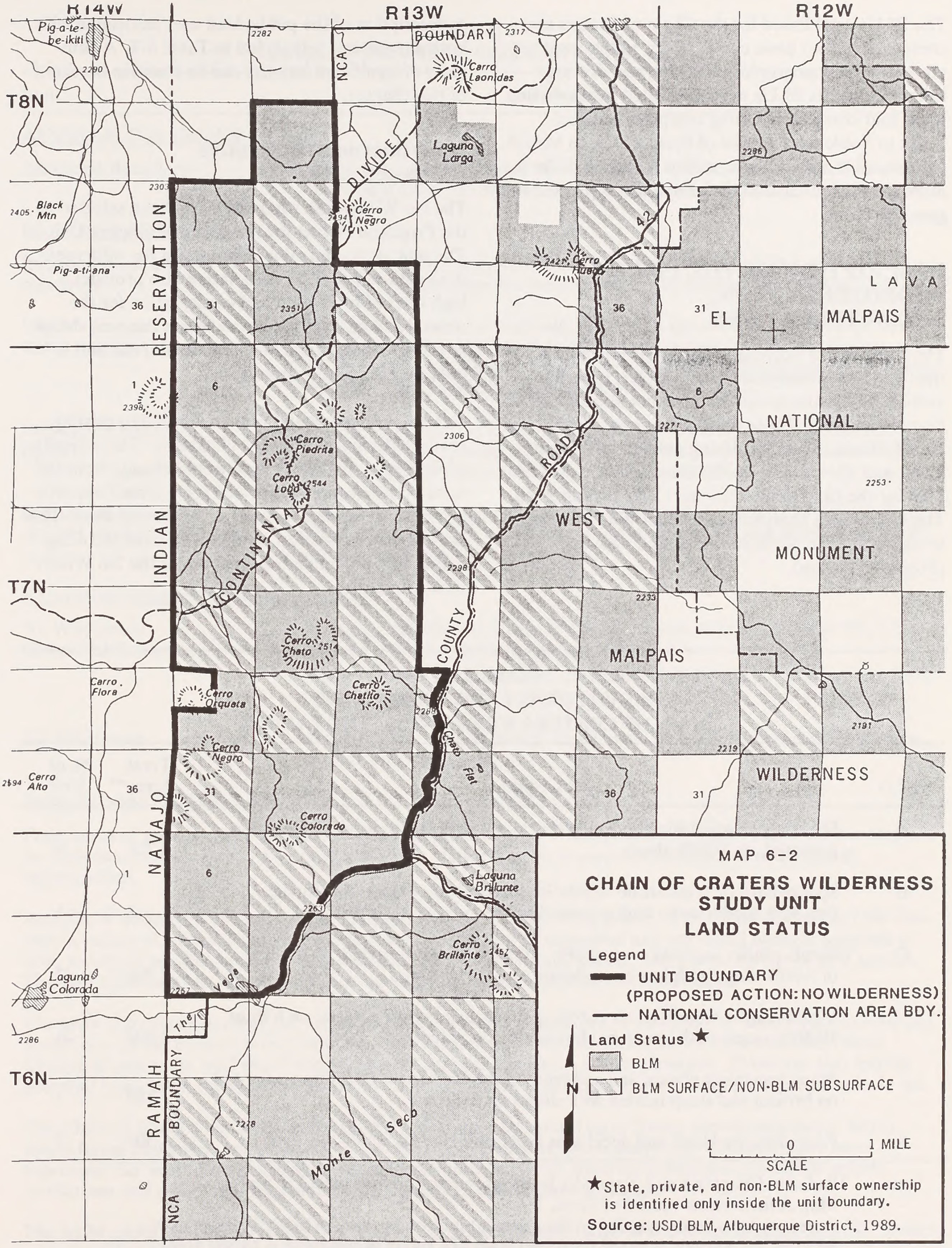
The Chain of Craters Wilderness Study Unit can be reached from County Road (CR) 42, which is accessed from New Mexico (NM) 53 on the north and NM 117 on the south. Access to the Chain of Craters is largely controlled by the condition of CR 42. The road is maintained by occasional blading, but water ponds on portions of the roadbed during wet periods, making it impassable during and after storms.

BIOPHYSICAL LAND UNITS

New satellite and computer technology available to the BLM is being used in this Chain of Craters Wilderness Study Unit Management Plan to define management based on existing land resources. The tool chosen as the basis for land management decision-making in this plan is the "Biophysical Land Unit" (BLU). This tool is derived from existing land resources, so its use allows the BLM to create a realistic planning model of the complex resource pattern that is found on-the-ground in the Chain of Craters Unit.



MAP 6-1
CHAIN OF CRATERS WILDERNESS STUDY UNIT



MAP 6-2
CHAIN OF CRATERS WILDERNESS STUDY UNIT, LAND STATUS

The BLUs established for the Chain of Craters are composed of four basic components: soil groups; vegetation types; topographic elements; and drainage information. Six BLUs were generated by combining these four components using computer analysis. Refer to Table 6-1 for a list of these BLUs, to Map A for a visual record of them, and to Appendix E for a more detailed discussion of the methodology used to generate them.

DESCRIPTION OF THE ISSUES, PROPOSED ACTION, AND ALTERNATIVES

The Summary of Scoping in Table 6-2 lists alternatives and issues analyzed in this chapter, as well as another alternative considered but not selected for detailed analysis. These alternatives were raised by the BLM and the public during public meetings on issues and alternatives for the General Management Plan for the El Malpais National Conservation Area. The alternatives analyzed are the All Wilderness Alternative and the No Wilderness Alternative (Proposed Action).

A description of the public land uses associated with both alternatives is included in Table 6-3. A summary of significant impacts can be found in Section 5 of this chapter.

No Wilderness Alternative (Proposed Action)

The No Wilderness Alternative has been selected as the Proposed Action for the Chain of Craters Unit. The unit meets the minimum criteria for wilderness designation, but NCA designation also provides a high level of protection and conservation for the natural and cultural resources within the unit. Most of these resources can be maintained if the unit is managed as conservation land.

Vehicular access would remain, limited to existing roads and trails as Map 6-3 illustrates. The majority of the Chain of Craters Unit would change from the semi-primitive, non-motorized recreational opportunity class to the semi-primitive, motorized class. This change in classification would result from the designation of a mountain bike trail under the No Wilderness Alternative.

TABLE 6-1
BIOPHYSICAL LAND UNITS IN THE
CHAIN OF CRATERS WILDERNESS STUDY UNIT*

BLU	Description	Total Acres**	% of Unit
A	Grass-shrub vegetation on sandy clay loams with low to moderate erosion potential, on 1-10% slopes.	1,700	9
B	Sparse-bare or grass-shrub vegetation on sandy clay loams, in alluvial fans with moderate to high potential for erosion, on 1-10% slopes.	2	<1
C	Shrub-conifer vegetation on cobbly, gravelly loams over cinders, on hills of 3-50% slope with low to moderate erosion potential.	7,700	42
H	Mixed conifer woodland on cobbly, gravelly loams over cinders, on hills of 10-50% slopes with low to moderate erosion potential.	8,400	46
I	Many vegetative classes and soil types of moderate to high erosion potential, on broken and steep terrain with slopes up to 60%.	200	1
K	Ponderosa parkland and deciduous vegetative classes.	300	2

Notes: *Refer to Chapter 1 and Appendix E for more information on BLUs, and to Map A for a visual record of them.
** Acreages have been rounded to the nearest hundred for ease of analysis, except for BLU B. As a result, acreage total for Chain of Craters in this table is 18,302 acres.

TABLE 6-2
CHAIN OF CRATERS - SUMMARY OF SCOPING

Item	Rationale
Alternatives Considered & Set Aside	
Amended Boundary	Increased access to Ramah Navajo lands would be unwelcome. This alternative would make the unit more vulnerable to disturbance.
Issues Raised & Set Aside	
Impacts on cultural resources	No significant impacts were identified. No sites were found, and only a few isolated artifacts were discovered during a 10-percent sampling of 8 sections.
Impacts on special status species	No impacts on state or federally listed threatened or endangered species were found. The US Fish & Wildlife Service concurs with this finding. Winter use by the American bald eagle (Haliaeetus leucocephalus) is recognized as a special wilderness feature of the unit.
Impacts on mineral rights	With the passage of PL 100-225, all federal minerals were withdrawn from entry. No federal minerals within the unit will be developed. All outstanding mineral rights are scheduled for acquisition by 1991.
Impacts on channel or gully erosion	Under the BLM's wilderness management policy, channel or gully erosion from human activity that threatens wilderness values can be controlled with watershed rehabilitation structures.
Alternatives Selected for Detailed Analysis	
No Wilderness (Proposed Action)	Existing protection of Chain of Craters as part of the El Malpais NCA is considered sufficient for the unit's resources. Some diversity of recreational opportunities in the NCA would be lost if the unit was designated wilderness.
All Wilderness	During wilderness inventory, 18,300 acres of public land were identified as having wilderness values.

Issues Selected For Detailed Analysis

Four issues of concern were identified for the Chain of Craters Wilderness Study Unit. These include impacts on wilderness values, livestock grazing use levels, Native American uses, and diversity of recreational opportunities.

Analysis of wilderness values is required by the BLM wilderness study policy. The Chain of Craters Unit contains a variety of volcanic and geologic features. A complex of rangeland and woodland habitats supports a wide variety of wildlife, including game such as deer, antelope, and turkey, and a wide variety of bird species. The unit's proximity to Bluewater Reservoir provides casual winter use for bald eagles.

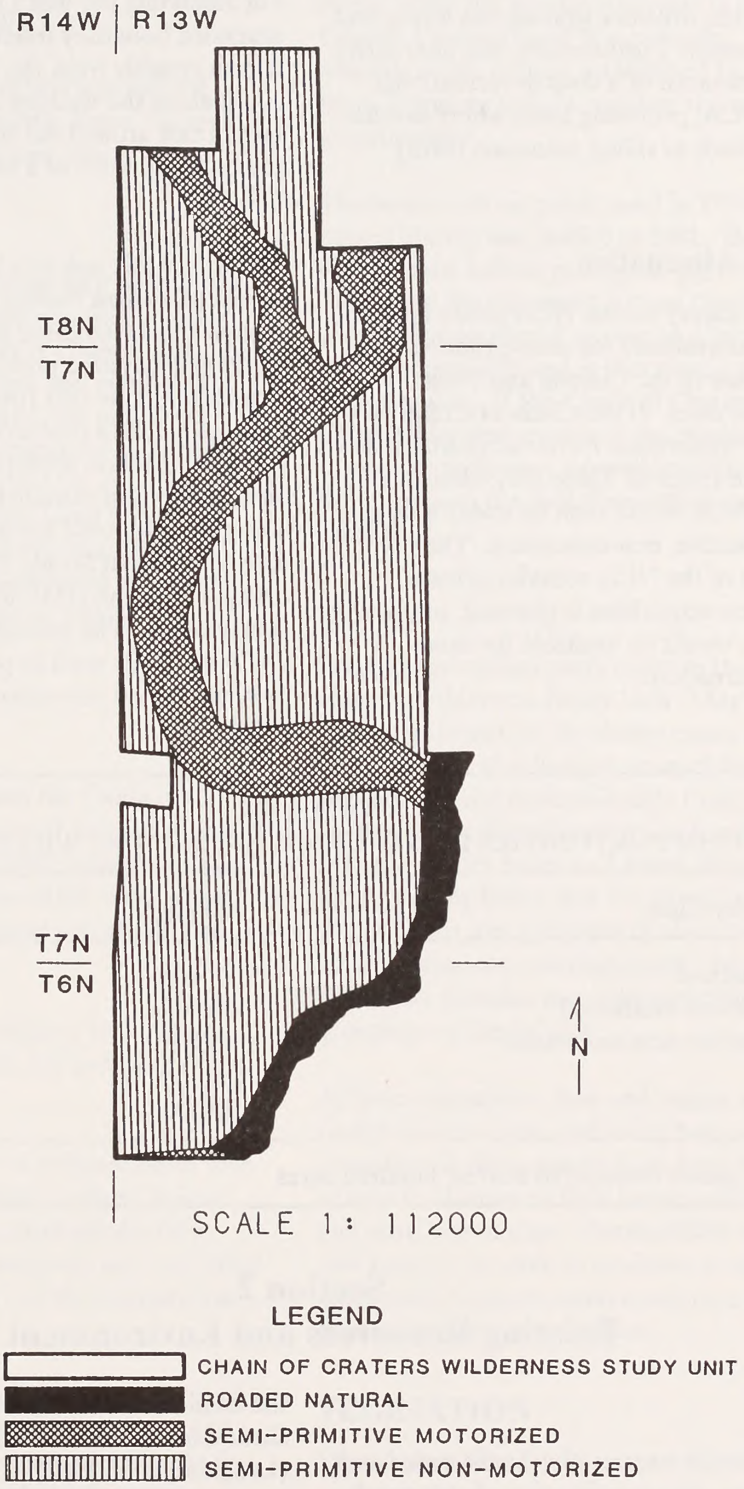
The level of livestock grazing use, inconvenience to livestock operators as the result of vehicle restrictions, and limitations on the construction of new improvements under wilderness designation were concerns raised. Closure of one water well would create a loss of water in the Cerro Chato allotment. Concerns also include potential impacts on the naturalness of the Chain of Craters Unit because of continued motorized vehicle use.

The Chain of Craters has many active religious sites used by several local Native American groups. Many plants found in the unit are used for food, medicine, dyes, and religious purposes. Concerns have been expressed that wilderness designation could inconvenience Native Americans because of possible vehicle restrictions and a potential requirement for permits to collect plant materials.

The BLM seeks to maintain a land base that can provide a diverse range of recreational opportunities. Impacts on non-wilderness recreation opportunities and maintaining diversity within the NCA are also issues of concern.

TABLE 6-3
DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVE

No Wilderness Alternative (Proposed Action)	All Wilderness Alternative
MANAGE TO MAINTAIN AND/OR ENHANCE EXISTING NATURAL AND GEOLOGICAL VALUES ON 18,300 ACRES OF CONSERVATION LAND. THE FOLLOWING ACTIONS WOULD BE TAKEN:	MANAGE TO MAINTAIN AND/OR ENHANCE EXISTING WILDERNESS VALUES ON 18,300 ACRES OF WILDERNESS. THE FOLLOWING ACTIONS WOULD BE TAKEN:
*All acreage would be managed as part of the El Malpais National Conservation Area.	*Approximately 35 miles of vehicular ways that currently receive low use (fewer than 200 vehicles/ year) would be closed.
*If conflict occurs between vehicle use and mountain bike use on the 35 miles of vehicular ways in the unit, the BLM will identify and restrict use on some ways.	*All range improvements would be managed subject to a Range Improvement Management Plan for the Chain of Craters Wilderness Unit.
*All allotment fences, 10 earthen tanks, 13 small metal tanks, one 12,000-gallon metal tank, and 7 miles of pipeline would be managed under Allotment Management Plans. The Cerro Chato Allotment well could be returned to service as a livestock water.	*Permits would be required for vehicle access to 10 earthen tanks, 13 small metal tanks, one 12,000-gallon metal tank, 7 miles of pipeline, and replacement of allotment fences. No more than one trip per year for repair is anticipated. The Cerro Chato Allotment well would be dismantled and rehabilitated (it was installed in 1981, after the passage of FLPMA); some other source of water would have to be found for that allotment. Casual use of ways would be precluded.
*Current grazing levels of about 5 to 10 head per section per year would continue. Trend plots would be monitored and changes in management negotiated with allottees if forage condition trend changes.	*Current grazing levels of about 5 to 10 head per section per year would continue. Trend plots would be monitored and changes in management negotiated with allottees if forage condition trend changes.
*Native American uses would continue with vehicular access along designated ways.	*Native American uses would continue. The BLM would recommend legislative authorization for limited vehicular access for traditional cultural and religious uses.
*One existing wildlife water and two existing wildlife exclosures would be maintained. Numbers of wildlife waters would be increased if environmental conditions allow.	*One existing wildlife water and two existing wildlife exclosures would be maintained. Permits would be required for vehicle access for repairs or replacement. No more than one trip per year is anticipated.
*The patchwork pattern of wildlife habitats would be maintained by allowing fuels removal, using fire, and by seeding native species as identified during monitoring.	
*About 9 miles of the Continental Divide National Scenic Trail would be routed through the Chain of Craters Unit.	*About 9 miles of the Continental Divide National Scenic Trail would be routed through the Chain of Craters Wilderness Unit.
*Recreation use levels would be monitored by collecting visitor use data at the BLM Ranger Station.	*Recreation use levels would be monitored by collecting visitor use data at the BLM Ranger Station.



MAP 6-3
RECREATION OPPORTUNITY SPECTRUM
IN THE CHAIN OF CRATERS WILDERNESS STUDY UNIT

The No Wilderness Alternative is considered manageable because it would have minimal impacts on the issues identified as important in the Chain of Craters Unit (wilderness values, diversity of recreational opportunities, livestock grazing use levels, and Native American uses). Furthermore, this alternative would allow maintenance of a diverse recreational land base in the NCA, providing lands where mechanized recreation (such as riding mountain bikes) could occur.

All Wilderness Alternative

The recreation inventory for the NCA shows approximately 88,800 acres available for semi-primitive non-motorized recreation in the Cebolla and West Malpais wilderness units. If the Chain of Craters was also designated as wilderness, 13,700 acres would be added to this figure (refer to Table 6-4); almost 40 percent of the NCA would then be under a designation of semi-primitive, non-motorized. The remaining acreage of the NCA contains private inholdings where no acquisition is planned, so less than half the NCA would be available for non-wilderness type recreation.

Amended Boundary Alternative

An alternative considered but dropped was that of designating the Chain of Craters Unit as wilderness but amending the unit's boundary. The proposed amended boundary follows a vehicular way that travels roughly from the unit's northern boundary south along the western side of the cinder cones, then curves east around the base of Cerro Chato and exits the unit just north of a homestead located close to CR 42.

The use of this way as a boundary would increase access to Ramah Navajo lands to the west, which the Ramahs have indicated would be unwelcome. It could also increase problems in deterring vehicular trespass into the unit from the west, and would thus provide no extra protection to the unit above what NCA designation confers. The vehicular way identified as the most reasonable amended boundary has also been proposed for use as part of the Continental Divide National Scenic Trail (refer to Map 3-5 in Chapter 3 of the GMP under the discussion of Recreation). The amended boundary proposed does not resolve the need to provide for more semi-primitive, motorized recreation opportunities within the NCA.

TABLE 6-4
RECREATION OPPORTUNITIES IN THE CHAIN OF CRATERS WILDERNESS STUDY UNIT

Opportunity Class	Acreage*	% of Unit
Roaded natural	900	5
Semi-primitive motorized	3,700	20
Semi-primitive non-motorized	13,700	75
Primitive	0	0
TOTALS	18,300	100

* Note: Figures rounded to nearest hundred acres

Section 2
Existing Resources and Environment

GEOLOGY

The Chain of Craters is a series of volcanic cones and craters aligned along a large-scale zone of structural strain (shear). This zone consists of northeast and north-trending faults, creating areas of weakness where basaltic magma has flowed to the earth's surface. The Chain of Craters Unit is a small portion of the Zuni-Bandera volcanic field where the structural shear zone has concentrated volcanic activity (Laughlin, et al. 1982). The most recent activity in the region occurred within the last 1,000 years.

Evidence indicates that the magma producing the volcanic features in the Zuni-Bandera field was generated at great depths in earth's mantle. Analysis and modeling of geophysical data suggest a shallow (3.5-km) magma body occurs in this area. The cinder cones within the Chain of Craters are thought to be associated with the northeastern edge of the hypothesized magma body (Ander 1980).

The cones formed as volcanic debris was ejected from vents and built up steep-sided slopes. Many of the cones have collapsed along one side.

MINERALS

Basalt and scoria are present in the unit but are not considered significant resources because they also exist outside the unit and the NCA (Bigsby and Maxwell, 1981). Despite geologic and geophysical evidence for geothermal potential, the unit is not included in any classification scheme for geothermal energy development. Neither the U.S. Geological Survey nor the New Mexico State Land Office has included the area in Known Geothermal Resource Areas (KGRAs) or Known Geothermal Resource Fields (KGRFs) (McLemore, et al. 1986).

WATER

Surface Water

No perennial streams flow within the Chain of Craters Unit. Unnamed ephemeral streams drain east and south away from the cinder cones into low-lying basins near the boundaries of the unit. Most streamflow results from infrequent intense storms and snowmelt.

Streamflow is highly variable within a year. Mean annual runoff ranges from 0.1 to 0.5 inches (Roybal, et al. 1984).

Hydrologically, the unit is part of a closed basin with no outflow of surface water. Water collects in low-lying areas where shallow lakes periodically form. Lake depth, areal extent, and longevity are controlled by the amount of precipitation and the evaporation rate.

Developed waters within the unit consist of earthen tanks and metal tanks for livestock operations, and metal catchments for wildlife. Some metal tanks for livestock are connected to buried pipeline systems. These tanks are supplied by a water well drilled on a private section outside the unit, and by a water well drilled on public land (T7N, R13W, NW1/4, Sec. 34) within 1/4 mile of CR 42 on the east side of the unit.

Ground Water

The northern portion of the Chain of Craters Unit is located within the Bluewater Underground Water Basin, while the southern portion is in the Rio Grande Underground Water Basin. These basins are administrative entities established by the New Mexico State Engineer to help regulate the appropriation of ground water.

The water well on public land in T7N, R13W (discussed above) was drilled in 1981. Because the well did not exist before passage of the Federal Land Policy and Management Act on October 21, 1976, it cannot be considered as part of a "grandfathered" grazing operation and is therefore a temporary improvement. If the Chain of Craters Unit is designated wilderness as part of the National Wilderness Preservation System, operation of the well would have to cease, the well dismantled, and the area reclaimed.

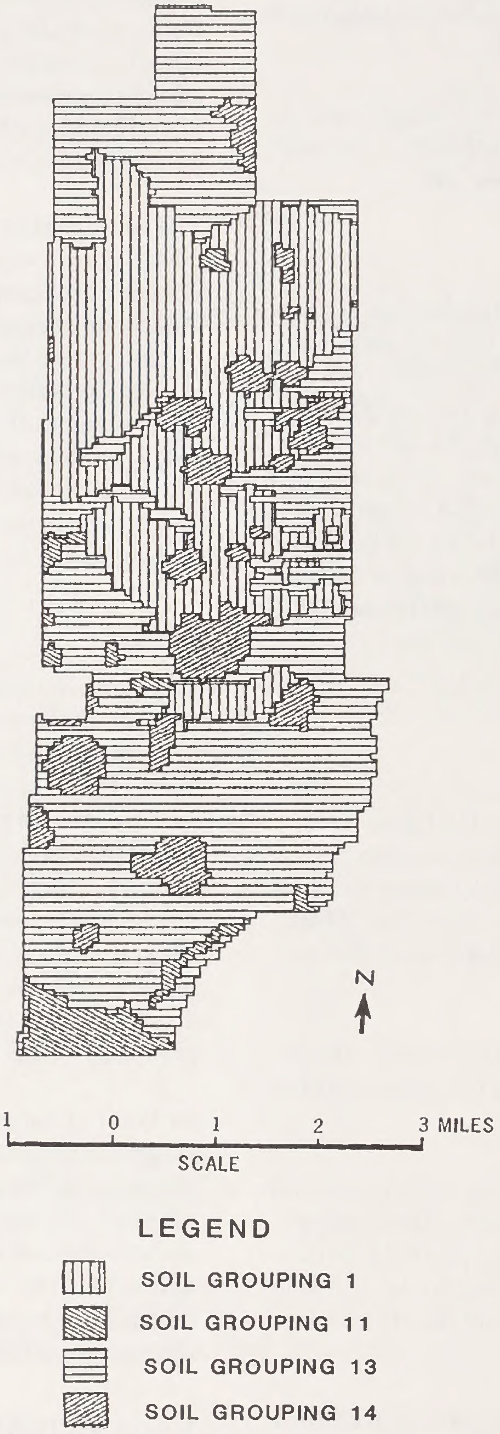
SOILS

Four soil groupings units occur in the Chain of Craters Wilderness Study Unit (Map 6-4). Soil groupings found on the cinder cones are gravelly, cobbly loams of colluvium or wind-blown sediments that are derived predominantly from cinders that cover unconsolidated cinders or basalt. Ridges between cinder cones and lower slopes are covered in sandy, cobbly loams that are very stoney in places. These loams are a mixture of alluvium and wind-blown sediments covering basalt. (Appendix E, Table E-1 contains more information on the soil groupings of the NCA.)

At lower elevations, fans and swales spread from the cinder cones to flats and valley bottoms. Soil groupings in these areas range from fine sandy loams of mixed alluvium to light brown sandy clay loams and olive brown clays. Permeability of soils in the unit tends to be slow to medium; erosion hazards are moderate. Overuse could encourage overland flow to channelize and create gullies.

VEGETATION

The Chain of Craters Unit contains two woodland and one rangeland vegetative type, according to the Bailey-Kuchler classification system. Additional information available from satellite imagery has allowed a more precise description of these three general vegetative types. This imagery shows that



(Description of Soil Groupings is found in Appendix E, Table E-1.)

MAP 6-4
SOIL GROUPINGS IN THE CHAIN OF CRATERS WILDERNESS STUDY UNIT

five vegetative classes form an intricate patchwork within the three Bailey-Kuchler vegetative types of ponderosa pine, pinon-juniper woodland, and grama-galleta steppe. These classes are mixed conifer, ponderosa parkland, shrub-conifer, sparse-bare, and grass-shrub. They are described below.

Ponderosa Pine

Located on the upper slopes of the cinder cones that form the backbone of the Chain of Craters Unit (at elevations of 7,300 to 8,300 feet), this vegetation type covers approximately 5,500 acres. Slopes range from 1 to 55 percent. This Bailey-Kuchler class contains both the mixed conifer and the ponderosa parkland classes found on vegetation maps produced using satellite technology.

The forest is actually a mixed conifer woodland that combines ponderosa pine, pinon, alligator bark juniper, and other juniper species. The occurrence of alligator bark junipers in the unit constitutes the northeastern extension of this species' range. Slope and aspect determine if ponderosa or pinon will be the dominant tree species at any site.

Shrubs include clumps of oak species, gooseberries, and mountain mahogany. Some deciduous clumps are large enough to be identified on satellite images, and probably provide important browse for a variety of wildlife. Forbs include Indian paintbrush, pingue, creeping mahonia, and buckwheats. Small areas of open ponderosa parkland occur with a grassy understory of Arizona fescue, mountain muhly, Junegrass, and mutton bluegrass.

Pinon-Juniper Woodland

Located on the lower slopes and ridges of the unit, pinon-juniper woodland ranges from 7,100 to 7,500 feet in elevation. This roughly approximates the satellite "shrub-conifer" vegetation class. Small patches of pinon-juniper woodland are scattered at higher elevations along the eastern and northeastern slopes of the cinder cones.

This vegetative type covers about 8,300 acres, invading into ponderosa pine at higher elevations. At lower elevations, this woodland invades shrublands. Slopes vary from 1 to 50 percent. Trees range in age from 1 to 30 or more years and show good growth.

Rocky Mountain junipers are more common at the higher elevations, while one-seed junipers become more common at lower elevations. Understory grasses are typically blue grama, with bottlebrush squirreltail and mountain muhly. Common shrubs are gray horsebrush, sage, snakeweed, and rabbitbrush. Forbs include Indian paintbrush, locoweed, mullein, saxifrages, and groundsels. About 20 percent of this area is rock outcrop.

Grama-Galleta Steppe

This Bailey-Kuchler vegetation type includes the satellite vegetation classes of sparse-bare and grass-shrub. Vegetation is sparse on grassy or shrubby fan terraces, flats, and swales that slope gently upward into shrub-conifer. Elevations range from 7,000 to 7,500 feet with slopes of 1 to 8 percent. This vegetative type covers about 4,500 acres of the unit.

Shrubs in the type include gray horsebrush, snakeweed, several species of sage, junipers, yucca, and opuntia cactus species with blue grama growing as a thin mat understory. Rabbitbrush forms nearly pure stands in some flatland areas. Lower flatlands in the southeast portion of the unit are predominantly blue grama or western wheatgrass, with forbs and shrubs common.

Special Status Plant Species

No special status (threatened, endangered, or candidate) plant species are known to occur in the Chain of Craters Unit. Should any species on either the federal or state list (or both) be identified within the unit, it will be protected in accordance with applicable laws and regulations.

WILDLIFE

The cinder cones, broken ridges, and brushy flats of the unit form diverse wildlife habitats. Satellite imagery and Biophysical Land Units (refer to Map A and Table 6-1) clearly show the patchwork character of the many wildlife habitats found in the Chain of Craters Unit.

This complex system provides potential habitat for over 60 species of birds, more than 20 species of small mammals, a mule deer herd, antelope, coyotes, bear, many species of reptiles, and game birds such as turkey and dove. The units' diverse vegetation and elevation make it attractive to many migrating species of birds. The rough terrain and good cover make it likely that the unit is visited by mountain lions. (Refer to Appendix G for a list of vertebrates whose ranges extend into the unit.)

Special Status Animal Species

No threatened, endangered, or candidate animal species on either the federal or state list are known to occur in the Chain of Craters Unit, with the exception of possible winter use by the American bald eagle. If eagles are sighted in the unit, every precaution should be taken to prevent their disturbance. (Appendix H lists the special status animal species potentially found in the NCA.)

VISUAL RESOURCES

The Chain of Craters Wilderness Study Unit contains exceptional scenic values. The unit has been designated as a Class II landscape with Class A/B scenic values. Class II designation indicates that any change in the basic landscape elements (form, line, color, or texture) caused by a management activity should not be evident in the characteristic landscape.

The views from the peaks of the cinder cones are of volcanic fields, sandstone bluffs rising above the flows, and broad panoramas of open forest with Mount Taylor in the background. The open forests create variety in form and texture in the foreground.

CULTURAL RESOURCES

Archeological survey in the Chain of Craters Wilderness Study Unit is limited to a 10 percent sampling of 8 sections, amounting to a total of 581 acres of Class III inventory. No cultural resource sites and very few isolated artifacts were found in this survey, suggesting that densities of cultural resources are very low in the unit.

Reconnaissance in the unit has revealed three historical sites near the unit's boundaries. A homestead consisting of two partially standing cabins, a barn, a cellar, and assorted materials is located close to the eastern boundary of the unit. A camp with two standing cabins and evidence of sawmill activities is located near the northern boundary. A large shrub meadow very close to the northwest boundary contains subtle evidence of a logging camp. The litter and log evidence is scattered and offers visitors a sense of wondering "what happened here?" and a chance to exercise their curiosity. Casual visitors may not realize they are on an historic site.

NATIVE AMERICAN ISSUES

At least three American Indian tribes (Acoma, Zuni, and Navajo) have close ties to the Chain of Craters Unit. All three claim it as part of the area they used before Europeans entered the region, and current political boundaries find the Chain of Craters immediately adjacent to the Ramah Navajo Reservation on the west.

Recognizing that Indian people have used the NCA in the past, the El Malpais legislation guarantees Native Americans access for traditional cultural and religious purposes (consistent with the American Indian Religious Freedom Act and the Wilderness Act). The El Malpais legislation further provides that specific portions of the NCA can be temporarily closed to protect the privacy of religious activities.

AIR QUALITY

Air quality over the Chain of Craters Unit is within state and federal standards. The unit has a federal designation as a Class II airshed (refer to the Glossary). This classification allows moderate degradation of the unit's air quality. The landscape characteristics of the Chain of Craters make alteration of the airshed apparent.

Section 3
Existing and Potential Uses

MINERAL DEVELOPMENT

No mineral resources have been developed within the Chain of Craters Wilderness Study Unit, and no mining claims or federal leases exist. A cinder pit was developed in a cinder cone north of the unit, but it is no longer in use.

With passage of the El Malpais legislation, all federal minerals in the NCA were withdrawn from entry and development. The private subsurface in the Chain of Craters Unit (approximately 8,960 acres) will be withdrawn once the rights are obtained through the exchange process (refer to Appendix B for a summary discussion of this process). This exchange is projected to occur by 1991.

The mineral potential of the unit is indicated in Table 6-5.

TABLE 6-5
ASSESSMENT OF MINERAL POTENTIAL IN THE CHAIN OF CRATERS UNIT

Commodity	Potential	Sources*
Oil and Gas	Low	1
	Moderate	2
Coal	Low	1, 2, 3
Geothermal Energy	Low	1, 2, 3
Metals	Low	1, 2

Notes: * Sources: 1. Maxwell, et al. 1989; 2. McLemore, et al. 1986; 3. Bigsby and Maxwell 1981.

WATERSHED

Water erosion is evident within the unit. Some vehicular ways are downcut to the point they are impassable. Where gully development has occurred, some two-tracks may skirt the developing gully.

Estimates of erosion rates in the unit range between 0.2 and 0.5 acre-feet per square mile (Roybal, et al. 1984). However, in contrast to the east side of the Conservation Unit where erosion rates range from 0.5 to 1.0 acre-feet per square mile, erosion in the Chain of Craters Unit is less severe.

Soils on the cinder cones under ponderosa pine forest tend to have slow to moderate permeability. Runoff is slow to medium, with erosion potential slight to moderate. Lower slopes and ridges in the pinon-juniper areas of the unit tend to have soils of slow permeability. Runoff is slow to medium, with erosion potential slight to moderate. The deep, well-drained soils of the brushy flats tend to have moderate erosion potential.

LIVESTOCK GRAZING

Portions of three BLM grazing allotments lie within the boundaries of the Chain of Craters Unit. Each of these allotments contains range improvements (refer to Map 6-5).

On these allotments, three Bailey-Kuchler vegetation groups occur: ponderosa pine, pinon-juniper woodland, and grama-galleta steppe. Within these three groups, a total of five vegetation classes are found: mixed conifer, ponderosa parkland, shrub-conifer, sparse-bare, and grass-shrub. All of these classes are used for livestock grazing.

Total dry herbage production in the unit ranges from 500 pounds per acre in poor years up to 1,200 pounds per acre in favorable years. Stocking rates range from 5 to 10 acres per animal unit month. The unit is poorly suited to yearlong grazing or grazing during the growing season.

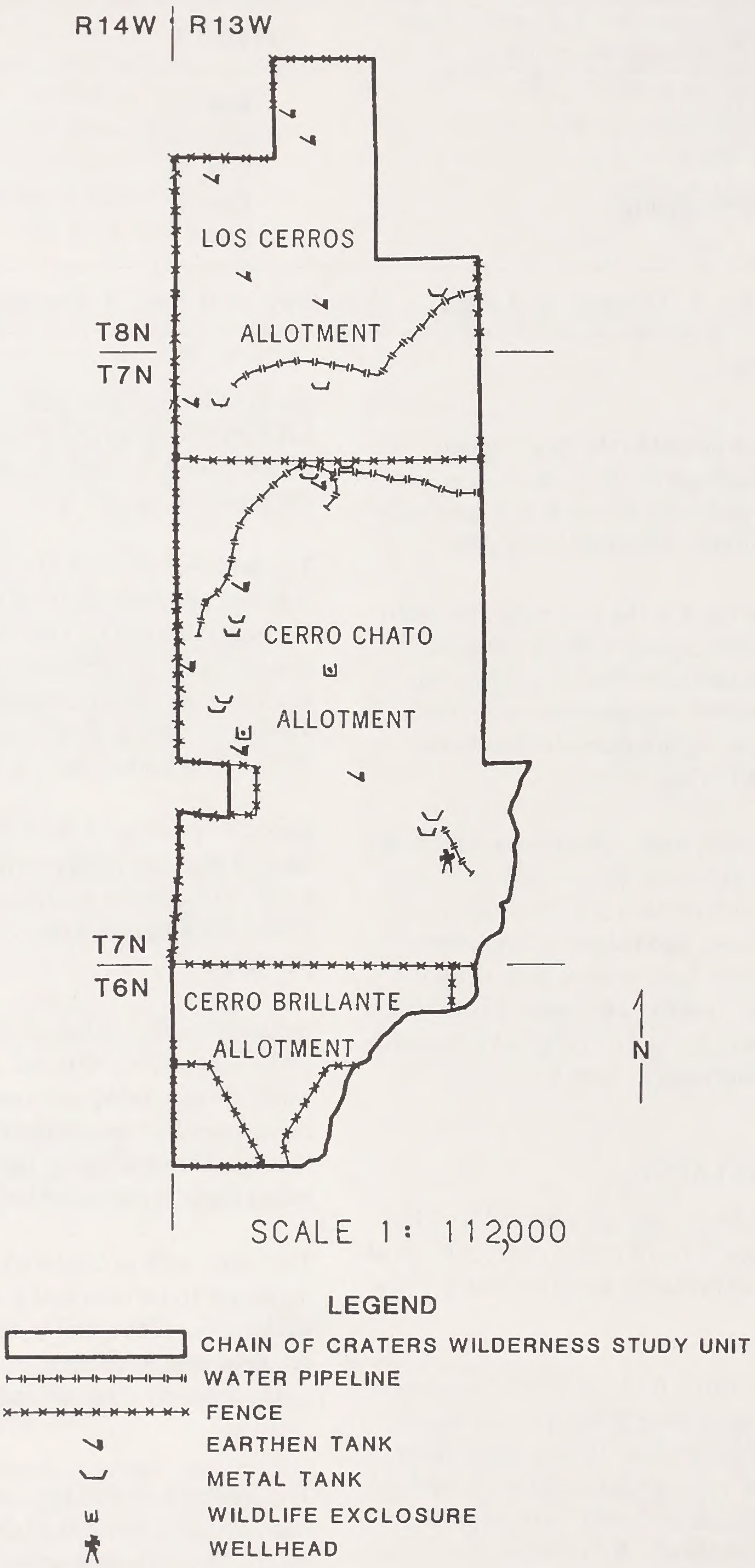
The northern portion of the Chain of Craters Unit contains approximately 20 percent of the Los Cerros Grazing Allotment. The current grazing use level for this allotment is approximately 5 head per section per year. Range improvements include approximately 6 miles of barbed wire fence line, six earthen tanks, three metal tanks, and 2 miles of buried pipeline.

Sixty-five percent of the Cerro Chato Allotment is located in the central portion of the Chain of Craters Unit. The current grazing use level for the Cerro Chato Allotment is approximately 9 head per section per year.

Approximately 6 miles of fence line, five earthen tanks (one breached), one water well, a 12,000-gallon water storage tank, and approximately 5 miles of buried pipeline are within the portion of the Cerro Chato Allotment inside the unit. A series of eight metal tanks is associated with the buried pipeline.

The water well in Cerro Chato was drilled in 1981; it may have to be removed if Chain of Craters becomes wilderness. If the well is not removed, it must be rehabilitated so damage to soils and vegetation from cattle concentrating around limited waters can be avoided.

The southern end of the Chain of Craters Unit contains about 12 percent of the Cerro Brillante Allotment. The current grazing use level for this allotment is approximately 10 head per section per year. Range improvements include about 7 miles of fence line.



MAP 6-5
RANGE IMPROVEMENTS IN
THE CHAIN OF CRATERS WILDERNESS STUDY UNIT

FOREST PRODUCTS

Records of logging in the Chain of Craters date from 1946 to 1970, with the majority of cutting occurring before 1959. However, designation of the Chain of Craters Unit as part of the El Malpais NCA in 1987 retired commercial timber production as a potential use. Pinon-juniper woodland in the Chain of Craters is considered suitable for fuelwood.

RECREATION

The most current BLM recreation inventory, the Recreation Opportunity Spectrum (ROS), has classified the Chain of Craters Unit as roaded natural, semi-primitive motorized, and semi-primitive non-motorized (refer to Map 6-3 and Table 6-4). The portion of the unit that borders CR 42 is considered roaded natural because it is maintained. However, the condition of CR 42 limits accessibility during wet weather.

The unit offers high potential for recreational use. Suitable activities include sightseeing, day hiking, mountain biking along old ways, backpacking, camping, semi-primitive motorized touring, and horseback riding. Opportunities exist for bird watching, landscape and nature photography, and observation of geologic phenomena.

The amount of recreation use in the Chain of Craters Unit has not been quantified. Hunting is known to take place; in recent years BLM employees have encountered deer hunters, mainly Native Americans, during patrols.

The BLM's Rio Puerco Resource Management Plan (RMP; USDI, BLM 1986) limited motorized vehicle use in the Chain of Craters to existing ways. Approximately 35 miles of inventoried ways exist within the unit (they are mapped in the RMP). Of the total, several miles of ways could be limited to mountain biking if a conflict occurs between vehicle users and mountain bike users. The remaining 10 miles would be open to authorized vehicle users. A proposal to route the Continental Divide National Scenic Trail through the Chain of Craters is being considered as part of the General Management Plan for the El Malpais National Conservation Area. (Refer to Map 3-5 in Chapter 3, under the discussion of trails in the Recreation section).

WILDLIFE

Two wildlife exclosures are located within the Chain of Craters Unit, both in T7N, R13W. One exclosure, located in Section 17, is situated in ponderosa parkland between two cinder cones. This exclosure contains an inverted umbrella water collection device. The other exclosure is located in Section 19 in a rabbitbrush flat. Water is available from a dirt tank located just south of this exclosure.

The area was included in the BLM's El Malpais Habitat Management Plan (HMP; USDI, BLM 1981), which proposed 28 wildlife projects in what is now the Chain of Craters Wilderness Study Unit. Projects included exclosures, waters, and habitat alteration. The GMP includes a Wildlife Resources Management Plan (refer to Chapter 11), which has modified the HMP.

EDUCATION AND RESEARCH

The Chain of Craters Unit offers an excellent opportunity for observing volcanic features. The unit could provide geology students the chance study volcanic processes and the features. Geologic research conducted in the past includes geochemical and isotopic studies (e.g., Laughlin, et al. 1982; Causey 1971).

The complex patchwork of habitats present in the unit creates the potential for diversity of plant and wildlife species (biodiversity), which could be a potential focus for biological research. The unit has also been used for geographic research that resulted in a recent Master's thesis (Carroll 1989).

NATIVE AMERICAN USES

The Chain of Craters Unit is a cultural landscape, used by local Native American groups in ways that define and perpetuate their culture and traditions. The uses these groups have made of the unit, including subsistence or economic uses as well as explicitly religious activities, are primarily tied to the concept of the sacredness of nature. Even though Indian people believe land resources are there to be used, they believe that use should be accompanied by reverence and proper respect for the spiritual power in the landscape.

Although all of El Malpais, indeed the universe, has this sacred character, certain points are more important than others. This may be because they are mentioned in origin stories, because they serve as symbols for events that took place in mythological time, or because they are places where spiritual beings can be contacted. General categories of places important to Navajo people include places important in mythology, places of spiritual danger, shrines, and gathering areas. Places important to Pueblo people include boundary points, places related to mythology, shrines, ancestral villages, pilgrimage trails, and gathering areas.

Examples of most of these general categories of places are believed to be present in the Chain of Craters Unit. However, Pueblo and Navajo people are reluctant to divulge the location of sacred places or discuss traditional cultural and religious practices in any detail. Furthermore, knowledge of many important places may be held by only a handful of people in a pueblo or tribe. Therefore, many specific places and practices pertaining to the Chain of Craters Unit are omitted in this discussion, and continued consultation and coordination with the concerned American Indian groups is imperative.

Little specific information is available concerning Pueblo use of the Chain of Craters Unit. Major Zuni shrines are located a short distance to the north, and Acoma boundary shrines are found to the north, west, and south.

The Ramah Navajo have expressed strong concerns about the Chain of Craters Unit. Many Navajo religious shrines are believed to be present in the unit. These places used for prayer may be important to the entire Navajo people or used only by an individual family. The Chain of Craters Unit also includes specific areas where plants, birds, minerals, and other natural substances are gathered for use in ceremonies, and more generalized areas where Navajos hunt, gather dye materials, and pick nuts.

CULTURAL RESOURCES

Presently no cultural resources are being actively managed in the Chain of Craters Wilderness Study Unit. Surveys conducted in the unit during the summer of 1989 indicated that cultural resources are very sparse in the unit.

Section 4
Wilderness Criteria

EVALUATION OF WILDERNESS VALUES

Quality of Mandatory Wilderness Characteristics

The quality of mandatory wilderness characteristics of the Chain of Craters Unit has been documented in the process of designating it as a Wilderness Study Area (El Malpais legislation; December 31, 1987). The following discussions elaborate on these characteristics.

Naturalness: A detailed description of the human impacts on the Chain of Craters Unit is documented in the Wilderness Intensive Inventory (USDI, BLM 1988c). When assessing naturalness, the BLM must consider the overall impact of such imprints on the entire unit. The distribution of human impacts and the size of the unit are variables to be considered.

In the Chain of Craters Unit, impacts include a fenceline network, 10 vegetated earthen tanks, a water well, seven water sites with 10 metal tanks, three small historic dump sites (these could be removed using hand tools), 20 vehicular ways (totaling 35 miles), 6 miles of buried pipeline, and two wildlife exclosures.

Past logging activity has left old stumps on the sides of some of the cinder cones. These stumps are dispersed throughout a range of maturity levels of mixed conifer and ponderosa pine. Some old slash piles from logging activity can also be seen.

Many of the vehicular ways appear to be abandoned and are difficult to trace in places. Some ways that appear on the 1967 US Geological Survey's 7 1/2-minute quadrangles are no longer visible because of vegetative overgrowth. The new vehicular ways that have developed since these maps were published would disappear if use was discontinued.

The berms around the earthen tanks are vegetated like the rabbitbrush meadows they stand in. These tanks are small and hold less than 10 acre-feet of water.

Only one tank was holding water at the time of inventory; the Cerro Chato Allotment was out of grazing use, so its tanks were in disrepair. The pipelines are adequately revegetated and unobtrusive. However, a 40-foot pipeline segment that needs replacement or repair is exposed.

One wildlife exclosure is located in ponderosa parkland and contains a wildlife waterer shielded by vegetative cover. The second exclosure is located in rabbitbrush flats edged by mixed conifer woodland, and blends in with its surroundings.

The unit as a whole appears natural and is considered to exhibit the wilderness characteristic of naturalness. Vegetation and topography screen human impacts, contributing to the unit's naturalness.

Solitude: The volcanic features of the Chain of Craters Unit offer exceptionally rugged terrain that is well vegetated with open, mixed conifer forest. Open shrubby meadows are widely interspersed throughout the unit amid forested ridges. The terrain and vegetation combine to create screening that provides an opportunity for solitude for a variety of user groups. Overall, the Chain of Craters Unit offers an outstanding opportunity for solitude.

Opportunities for Primitive and Unconfined Recreation: BLM criteria define this wilderness characteristic as the potential for a wilderness study area to provide chances for diverse activities that are not dependent on motorized vehicles. The Chain of Craters Unit displays scenic values and lends itself to sightseeing, day hiking, nature photography, birdwatching, backpacking, camping, and horseback riding. The unit provides an outstanding opportunity for primitive recreation.

Special Features

The Chain of Craters Unit is part of a large volcanic field in west-central New Mexico. The complex terrain and vegetation offer a variety of habitats for many species of wildlife including deer, bear, raptors, and possibly a mountain lion. The unit may occasionally be used as wintering ground by bald eagles. Several historic homesteads are located within the unit.

Multiple Resource Benefits

The Chain of Craters Unit contains many natural values. Congressional designation of the unit as wilderness would carry the weight of law and provide long-term protection for these values. The designation of the unit as part of a National Conservation Area implies a Congressional mandate for the BLM to protect and conserve resources within the unit, and also offers a form of long-term protection. (A more detailed discussion of the multiple resource benefits of wilderness designation may be found in Section 5 of this chapter, in the discussion of the impacts of the All Wilderness Alternative.)

Diversity in the National Wilderness Preservation System

Ecotypes Present: The vegetative-ecosystem classification for the Chain of Craters Unit is as follows (after Kuchler 1964; Bailey 1976):

- Dry Domain
  - Highland Province
    - Colorado Plateau Subprovince
      - Ponderosa pine - 5,500 acres (30 percent)
      - Pinon-juniper woodland - 8,300 acres (45 percent)
      - Grama-galleta steppe - 4,500 acres (25 percent)

Biophysical Land Units generated for the Chain of Craters Wilderness Study Unit have allowed a clear view of the unit's complex pattern of habitats. Seven distinct BLUs have been identified in the Chain of Craters, as shown on Map A. Table 6-1 in Section 1 of this chapter describes these BLUs.

Distance from Major Population Centers

The Chain of Craters Unit is within 1 hour's drive of Grants, New Mexico and within a day's drive (5 hours) of Bernalillo and Sandoval counties. In the 1980 census, parts of these two counties were included in a Standard Metropolitan Area (USDC, BC 1982). The unit is within 3 hours of Albuquerque and 4 hours of Santa Fe, two of the largest population centers in New Mexico.

MANAGEABILITY

To be recommended for wilderness designation, the Chain of Craters Unit must be capable of being effectively managed as wilderness. In determining manageability, the BLM must consider such factors as private and state inholdings, valid existing rights, mineral leases, rights-of-way, and the overall land ownership pattern.

No private surface inholdings, mineral leases or claims, or rights-of-way exist in the Chain of Craters Unit. As of March 1990, private subsurface rights are present. If this private subsurface was not acquired by the BLM, the private mineral rights would be vested, and any minerals present could be developed by the holders of those rights. However, if land acquisition proceeds as planned (refer to Appendix B, a summary of the BLM Land Protection Plan), the private mineral estate within the unit will be acquired by 1991.

The three grazing allotments that encompass the unit are not considered to be incompatible with wilderness management. Because private subsurface will be acquired and grazing allotments are not incompatible, the BLM's ability to manage the unit as wilderness should not be impaired by these two factors.

However, land ownership along the margins of the unit (Ramah Navajo on the western border, and other private owners on the northern and eastern borders) may present management problems. The possibility of trespass onto private or tribal land by wilderness users exists. Such trespass might occur regardless of wilderness designation. The proximity of the subdivided quarter-section to the north of the unit could intrude on the unit's visual qualities if development takes place.

Section 5

Alternatives and Impacts

INTRODUCTION

This section discusses two alternatives for management of the Chain of Craters Wilderness Study Unit: the All Wilderness Alternative and the No Wilderness Alternative. Table 6-3 in Section 1 of this chapter summarizes these alternatives. Under the No Wilderness Alternative, the Chain of Craters would be managed as part of the El Malpais National Conservation Area and receive the same level of long-term protection.

The Amended Boundary Alternative (for designating part of the Chain of Craters as wilderness) has not been analyzed. The only logical modified boundary is a vehicular way that would make maintaining the wilderness quality of the amended unit difficult.

ALL WILDERNESS ALTERNATIVE

Under this alternative, the entire 18,300 acres of public land within the Chain of Craters Unit would be recommended as suitable for wilderness designation.

Impacts on Wilderness Values

If the Chain of Craters was designated as wilderness, existing and potential uses would be managed under the BLM's wilderness management policy (USDI, BLM 1981c). The Chain of Craters' existing natural character, opportunities for solitude, and opportunities for primitive and unconfined recreation would be maintained. The outstanding volcanic and geologic features would be preserved, as would the winter range for bald eagles.

Under wilderness management, the patchwork character of existing wildlife habitats may be lost without some permitted manipulation. Young conifers are growing into the meadows of the shrub-conifer and ponderosa parkland habitats. If habitat manipulation is restricted, the complex pattern of habitat types could grow into a blanket of mixed conifer forest that would attract fewer varieties of wildlife.

Because of the excess fuels buildup in the unit, fire is possible and could result in a damaging rather than a healthy situation. Increased activity and noise levels may occur from users attracted into the unit by the Continental Divide National Scenic Trail, or for wilderness-related recreation. However, these occurrences will likely take place in the unit under non-wilderness designation as well.

Restricting surface-disturbing and mechanized activities and allowing only permitted use of about 35 miles of vehicular routes by range allottees would provide for the long-term protection of vegetation and moderately erodible soils along roadways.

Wilderness designation would maintain the natural setting upon which Native American uses are often based. However, the frequency of the visits for such uses may decline because of the presence of increased numbers of visitors in the unit.

Very few archeological resources have been identified in the unit, although several historic sites are known. Increased use could result in damage to these historic resources. Such use would likely occur under non-wilderness designation as well.

Conclusion: Under the All Wilderness Alternative, long-term protection would be provided to the wilderness resources in the Chain of Craters Unit. However, loss of the patchwork pattern of wildlife habitats is possible because of management restrictions under this alternative. This loss would cause fewer varieties of wildlife to be attracted to the unit.

Impacts on the Diversity of Recreational Opportunities

Under the All Wilderness Alternative, primitive non-motorized recreation could occur; the unit could be accessed on foot or by pack animal only. Specific motorized recreational experiences would be lost under this alternative.

One form of mechanized recreation that would be prohibited under this alternative is mountain biking, which has become a popular recreational activity. Inquiries about opportunities for this activity in the NCA have already been received by the BLM.

A goal of the BLM recreation program is to maintain a land base that can support a diverse range of recreation opportunities within a variety of settings, ranging from primitive to developed. If the Chain of Craters Unit was designated as wilderness, over half the NCA would exclude any form of mechanized or motorized transport within a primitive setting, including mountain biking.

Conclusion: Under the All Wilderness Alternative, less than half the NCA would be available for motorized, non-wilderness opportunities.

Impacts on Livestock Grazing Use Levels

Under wilderness management, occasional maintenance of existing range improvements using motorized equipment is permissible, based on a rule of minimum tool. Casual use of vehicles for inspection or for minor repairs of existing facilities is precluded.

Vegetation and soil treatments could be used in the Chain of Craters Unit where human influences create a serious threat to or loss of wilderness values, or would cause depreciation of environmental quality outside the wilderness. These treatments could include erosion control structures. Vehicle access and motorized equipment use (including heavy equipment) may be authorized for construction if it is determined to be the minimum tool needed.

Livestock grazing use levels would continue at approximately 5 to 10 head per section per year for two of the three allotments overlapping the Chain of Craters Unit. These are the Los Cerros and the Cerro Brillante allotments. However, livestock operations would be affected by limitations imposed on the use of motorized equipment for maintenance of about 24 miles of fence (which includes 5 miles of boundary fence between allotments within the unit), 7 miles of pipeline, 14 metal tanks, 13 earthen tanks, and 2 wildlife exclosures (refer to Map 6-5). The life of such range improvements is estimated at 10 years for fences and 20 years for earthen tanks.

One well located in the Cerro Chato Allotment was drilled after passage of the Federal Land Policy and Management Act on October 12, 1976, and could be closed at the time of wilderness designation. Some other source of water supply would have to be found for operations to continue in this allotment.

Sixty-five percent of the Cerro Chato Allotment covers the middle third of the Chain of Craters Unit. Potential permittees on this allotment would have to walk or ride horseback, increasing the amount of time required to work the area previously covered by vehicle.

The Cerro Brillante Allotment overlaps 12 percent of the southern portion of the Chain of Craters Unit. Restricted use of vehicles in the unit could impact the permittee's management style and costs. This would also be true for the permittee on the Los Cerros Allotment, where 20 percent of the allotment overlaps the northern portion of the unit.

Conclusion: Under wilderness designation, livestock grazing use levels would continue, and reasonable access would be granted for maintenance of range improvements.

Impacts on Native American Uses

Identified Native American uses of the Chain of Craters Unit include gathering of vegetative materials for use as dyes and medications, and for religious purposes; gathering of pinon nuts; visiting locations for religious activities; and hunting. All identified uses would be allowed under wilderness designation.

However, several local Native American groups have indicated that wilderness restrictions on access would make the unit less suitable for religious practices. Wilderness designation itself is seen by these Native Americans as a pre-emption of traditional uses and an example of non-Indians taking control of traditional Indian cultural practices. These perceptions would impede Indians' continued use of the unit.

Prohibiting vehicular use would make it necessary to visit the area on foot or by horseback and would impact on the time and methods used to conduct certain activities, particularly for older Native Americans. Because traditional cultural practices are most commonly taught by older Native Americans, access restrictions may impede the transmission of traditional values and practices to younger generations.

If legislation is introduced that proposes the Chain of Craters Unit as wilderness, the BLM will recommend that a special legislative provision be made. This provision would allow limited vehicular access for the specific purpose of Acoma, Zuni, and Ramah Navajo traditional cultural and religious uses.

Visitors attracted to the unit for wilderness-related recreation or use of the Continental Divide National Scenic Trail could decrease the privacy of Native Americans conducting religious and other traditional practices. This visitor use would likely occur under the non-wilderness alternative as well.

Conclusion: Under the All Wilderness Alternative, Native American users would not be able to employ vehicles to access the unit. Unless special legislative exceptions are made, access would be by horseback or on foot. In the long term, use of the unit for traditional Native American practices would decline.

NO WILDERNESS ALTERNATIVE (PROPOSED ACTION)

If the Chain of Craters WSA was not designated as wilderness, it would be managed as part of the Conservation Unit under the El Malpais GMP with general goals of conservation and preservation. In the short term, the unit would be managed under the Rio Puerco Resource Management Plan (RMP) approved in 1986. The Chain of Craters Unit is part of the El Malpais Special Management Area described in the RMP, and would be managed accordingly.

The objective of NCA designation is to emphasize the protection of wildlife habitat, visual values, cultural values, scientific values, and interpretive values. Recreational uses such as primitive, semi-primitive non-motorized, semi-primitive motorized, and roaded natural recreation opportunities are emphasized. Motorized vehicle use would be limited to existing roads and trails. Efforts to acquire non-public estate would continue. Woodcutting could be used in selected areas for wildlife habitat management.

Impacts on Wilderness Values

In the short term, the NCA's management objectives for the Chain of Craters Unit would maintain the wilderness values. In the long term, the semi-primitive non-motorized recreation opportunity would shift to a semi-primitive motorized opportunity.

For most of the Chain of Craters Unit, impacts to wilderness values would be limited because increased mechanized access would occur on the designated mountain bike trail. Opportunities for solitude would decrease. Increased activity and noise levels would result from recreationists using mechanized forms of transport. Continued use of ways by visitors using these mechanized forms of transport would impact wilderness naturalness by preventing the trails from revegetating.

The patchwork of existing wildlife habitats could be maintained through specified manipulation. Such manipulation would have to be identified as appropriate through a monitoring process.

Impacts to cultural resources could increase as user demand on the unit grows. This impact would likely occur under non-wilderness as well. Very few archeological resources have been identified in the unit, although several historic sites are known. Increased use could result in damage to these historic resources.

Conclusion: In the short term, the No Wilderness Alternative would have minimal impact on wilderness values in the Chain of Craters Unit. Semi-primitive non-motorized opportunities for recreation would be replaced by semi-primitive motorized opportunities. Supplemental values (scenic, wildlife, and cultural) would be maintained. In the long term, availability of naturalness, solitude, and primitive recreation in the unit would be diminished.

Impacts on the Diversity of Recreational Opportunities

Under the No Wilderness Alternative, the existing recreational diversity of the unit would be maintained. Several miles of vehicular ways could be open for mechanized transport (such as mountain bikes) but closed to motorized transport (such as automobiles), if conflicts between vehicle users and mountain bikers occur. Opportunities for primitive recreation could be found elsewhere in the NCA (on 102,500 acres within the existing wilderness units, Cebolla and West Malpais).

Impacts on Livestock Grazing Use Levels

Under the No Wilderness Alternative, livestock grazing levels would continue at approximately 5 to 10 head per section per year. The permittees and BLM could continue to use the vehicle routes in the unit to access existing range improvements (24 miles of fence, 7 miles of pipeline, 14 metal tanks, 13 earthen tanks, and 2 wildlife exclosures) for construction, inspection, and maintenance. Fewer constraints would apply to the types of construction materials used or the location of improvements. Vegetation and soil treatments could be implemented if they were consistent with NCA management objectives.

Conclusion: No impacts would occur to livestock grazing use levels under the No Wilderness Alternative. Livestock operators would be able to use motorized vehicles to access range improvements.

Impacts on Native American Uses

Under the No Wilderness Alternative, Native Americans could continue to use designated vehicular routes to collect vegetative materials for dyes, medications, and religious purposes; collect pinon nuts; hunt; and conduct religious activities at sites in the Chain of Craters Unit. However, increased recreational use of the unit could impact the privacy of some religious activities, and could lead to the degradation of shrines or offering sites.

Conclusion: In the short term, no impact would occur to Native American uses. In the long term, conflicts could develop between traditional Native American cultural and religious practices and increasing recreational use. The degree of such conflict is unknown.

Section 6

Consultation and Coordination

This report for the Chain of Craters Wilderness Study Unit has been prepared with public input obtained by mail, at public meetings, and from personal contacts. These efforts began before the wilderness intensive inventory and have continued during preparation of the El Malpais General Management Plan.

Several comments directly related to the Chain of Craters Unit were received during the public comment period on the Draft El Malpais EIS (USDI, BLM 1981a). Three of these inputs favored designating Chain of Craters as wilderness because of its natural and scenic character. Three inputs indicated the number of routes through the area made it unsuitable for wilderness.

More recently, proponents of wilderness designation cite justifications such as the unit's natural character and its setting within the El Malpais NCA. The Chain of Craters Unit is also contiguous with the western boundary of the West Malpais Wilderness Unit, a fact that leads some people to support wilderness designation for Chain of Craters.

Opponents of wilderness designation for the Chain of Craters Unit cite possible limitations on ranch operations, restrictions on access for traditional Native American religious purposes, and potential impacts on the gathering of vegetative materials by Native American people. The existence of approximately 102,500 acres of designated wilderness within the NCA boundaries has raised concerns by some recreators that other non-wilderness-related recreational opportunities may be limited or lost within the NCA, and that it may become de facto wilderness in its entirety.

On December, 31, 1987, the Chain of Craters was designated a Wilderness Study Area by the El

Malpais legislation. Public meetings were held in Grants and Albuquerque, New Mexico in June, 1988, and in Ramah, New Mexico in August, 1988. The purpose of the meetings was to hear the public's opinions on issues related to the El Malpais NCA and National Monument. An edition of the El Malpais Update newsletter was also mailed to the public, requesting input on the issues by means of a comment sheet included in the mailing.

As a result of the meetings and comment sheets submitted to the BLM, several concerns related to the NCA and National Monument were identified. The public comments received included 13 inputs on the Chain of Craters Unit and the management of wilderness in general. Five of these inputs expressed support for wilderness designation of the Chain of Craters. Reasons cited were the potential wildlife benefits and the untrammeled naturalness of the unit.

Three public inputs were apprehensive about grazing having an impact on the wilderness characteristics of the unit. Seven comments reflected a concern that wilderness designation would negatively impact ranching operations. Ten public inputs indicated that wilderness designation would make collection of vegetative material for traditional cultural and religious uses difficult for local Native Americans.

Additional public meetings were held in Albuquerque and Grants in December of 1988, and in Acomita and Ramah in January of 1989 to discuss alternative ways of managing the NCA and the Chain of Craters Unit. Another edition of the El Malpais Update newsletter including an alternatives workbook was mailed to the public for input regarding NCA management objectives.

Public input received in response to this set of meetings and the newsletter mailing included 17 comments that wilderness designation would negatively impact existing ranching activities. Fourteen comments expressed concern that the diversity of wildlife habitats in the Chain of Craters and other parts of the NCA should be maintained. Twenty-two comments reflected the view that wilderness designation would negatively impact access to the Chain of Craters for older Native Americans to conduct traditional practices or collect vegetative materials for cultural or religious purposes.

Seventeen comments supported the placement of part of the Continental Divide National Scenic Trail through the Chain of Craters. Eighteen comments favored the closing of specified roads or ways inside Chain of Craters boundaries, while 21 comments favored upgrading County Road 42 at least in part to improve access to the Chain of Craters Unit. Thirty-two comments expressed concern that the large adult pinons in the Chain of Craters be protected, while 10 comments expressed concern that more fires could occur in wilderness because fuels removal by woodcutting would be limited.

On January 13, 1989, the Ramah Navajo Chapter passed a resolution affirming that the entire El Malpais is very sacred to the Ramah Navajos. The resolution states that it is important to the chapter that development be restricted and privacy ensured for traditional practices. It also states their need for "unlimited and unrestricted access to the El Malpais to gather plants, native foods, medicines and salt required for traditional purposes, to make sacred offerings, and to carry out other traditional cultural practices and uses."

CHAPTER 7

Monitoring Plan (Deferred to the Final GMP)

CHAPTER 8

Implementation Plan
(Deferred to the Final GMP)

PART 2

CHAPTER 9

Interpretation and Education Plan

Chapter 9
Interpretation and Public Education Plan

THROUGH INTERPRETATION COMES UNDERSTANDING,
THROUGH UNDERSTANDING COMES APPRECIATION,
THROUGH APPRECIATION COMES PROTECTION.

Section 1
Introduction

The El Malpais legislation calls for the development of interpretation, public education, and information plans. Objectives developed jointly by the BLM and the NPS are guiding plans for interpretation within the National Conservation Area and the National Monument.

Various types of programs and interpretive media will convey specific themes; however, the overall concept for interpretation throughout the NCA focus on and contribute collectively to accomplishing the following objectives:

* To enhance visitor understanding of the forces that created this rugged landscape, including first-hand experiences with selected features.

* To instill feeling, respect, love for El Malpais in visitors by interpreting it through the eyes of local Native Americans.

* To give visitors an understanding of the complex ecological relationships in El Malpais and the place of human beings within those relationships.

* To give visitors an understanding of the transition from the Chacoan era of a thousand years ago to the present.

* To provide the information necessary to ensure visitor safety as well as protection of cultural and natural resources.

* To provide a sense that this is a special place where, if one invests the time, one can feel the spirit of El Malpais and find one's heart and mind at rest.

* To develop interpretative materials in cooperation with interested local Indian tribes.

Interpretation attempts to convey information, concepts, and principles while creating changes in attitude and emotional states. In a sense, interpretation is a form of public education. Natural history, cultural resources and historical resources themes can be used to develop these objectives.

Section 2
General Goals

Interpretation is a means of increasing the meaning of each visit and expanding the visitor's experience. Before meaningful interpretation can begin, however, the visitor must be put in contact with the resource. At El Malpais, this will be accomplished through specific programs that:

1. Introduce the area, by providing an overview upon or before entering the NCA.

* To inform visitor of general services, activities, and features, so they may plan their visits effectively;

* To develop background information on the area's meanings and values, so as to enhance appreciation of the NCA and respect for its environment;

- To inform visitors of conditions, hazards, and regulations, so they may have a safe and enjoyable visit;

- To encourage full visitor participation during the visit.

2. Provide activities and on-site programs that involve visitors more deeply, if they have time or can be motivated to take the time.

- To provide personal contact opportunities between staff and visitors, thus reinforcing public support for BLM programs while at the same time receiving feedback;

- To explain multiple use management programs--especially in resource management, wilderness, resource protection, and planning;

- To foster the enthusiasm of "friends" groups such as Los Amigos del Malpais and cooperating association members to continue to actively support the National Conservation Area.

- To provide professionally produced interpretive media in cooperation with the NPS, other federal and state agencies, teaching and research institutes, and volunteer groups.

Section 3
Current Situation

The existing interpretive program for the NCA centers on the El Malpais Information Center in Grants, which is open year round. The facility includes a staffed information desk, exhibits, and sales of maps and publications. The only printed guide available is the free publication that covers both the NCA and NM. The information center also contains administrative offices, the naturalist's office, and a small library for the El Malpais Information Center. Currently, hikes and caravans begin at the Information Center. An interpretive prospectus is being developed for use at the El Malpais Information Center.

Environmental education programs are conducted at local schools with an occasional field trip into El Malpais.

Entrance signs are posted on NM 117. Signing for the Cebolla Wilderness boundary has been initiated along NM 117, and for the West Malpais along County Road 42, but no interpretive signing has been done.

Advertising is accomplished by bulletins distributed throughout the Grants area, newspaper notices published in the region, two small signs on Interstate 40, and by word of mouth.

A marketing plan is being developed and will be implemented for the El Malpais NCA to educate and inform the public and BLM employees about the NCA's resources. The Draft Plan has been presented to the Grants Chamber of Commerce and was well received. As a component of marketing, the BLM will undertake public outreach and cooperation by developing and maintaining contacts with teaching and research institutes, non-profit organizations, other state and federal agencies, and Native American groups. Public outreach is one method of promoting the BLM's commitment to providing a variety of uses on public lands while conserving resources for the benefit of present and future generations.

Visitors vary widely and include: truckers who stop on NM 117 to view or photograph La Ventana Natural Arch, vehicle campers, Native Americans, cattle operators, mountain bikers, dispersed recreation users, wilderness users, and researchers.

As El Malpais becomes better known, increased use can be expected. Existing uses will continue, and may increase in frequency or duration. Users in the future will likely come from a great diversity of cultural, social, and economic backgrounds. As programs in environmental education and marketing are implemented, greater knowledge of the NCA's resources will be available to more people. This increased use will challenge the BLM to effectively provide interpretive and education services to a wider variety and greater numbers of the public.

The expanding population in the Southwest, increased disposable income, more leisure time, and increased recreational vehicle ownership, especially four-wheel-drive vehicles and mountain bikes, will tend to increase visitor use of the area. Travel and within the NCA will continue to be primarily by private vehicle, but tour bus use is expected to increase. Most will stay on paved or well-graded roads. More visitors may get to the less traveled areas by primitive road, and a few will hike into the backcountry areas.

The large size of El Malpais National Conservation Area and the variety of its resources results in a dispersed pattern of visitor use, making it difficult to assemble groups. This requires activities tailored to individual traveling parties. Overall, dispersed use could reduce the potential for congestion within the NCA. An exception to this dispersed use is along paved transportation corridors and well-maintained roads.

Section 4
Elements Of This Plan

INTRODUCTION

This interpretive plan is arranged by element, each representing a different component of interpretation and public education. These include: interpretation & information; natural resource/environmental education; and marketing. The various techniques which will be used to implement these elements are outlined. Management prescriptions and actions are listed in tables under each element of the plan for easy reference.

INTERPRETATION AND INFORMATION

Interpretation is not just the dispensing of factual information, although information is a component of interpretation. The chief aim of interpretation is to provoke thought. This can be accomplished by both offsite or onsite methods.

Onsite interpretation occurs at the feature or place that is being interpreted. Locations where onsite interpretation is proposed to occur are listed in Chapter 3 in the Recreation section.

Offsite interpretation occurs away from the feature or place that is being interpreted. The BLM Ranger Station will serve as the primary offsite interpretive facility for the NCA (refer to Chapter 3, Recreation section). For visitors arriving after hours or not wanting to stop at this facility, orientation kiosks will provide information to visitors for a safe and enjoyable visit. The Multiagency Center in Grants will also function as an offsite interpretive facility (refer to NPS GMP for complete discussion of this facility).

ENVIRONMENTAL EDUCATION AND SCIENTIFIC RESEARCH

A broader definition of interpretation and education implied by the El Malpais legislation, includes scientific research. One mechanism being proposed for promoting public education as well as scientific research is a Field Learning Center. This concept would be implemented by the BLM, in cooperation with other private and public agencies.

Objectives for the Field Learning Center include the following:

> * Provide for cooperation between federal agencies, teaching institutes, and research institutes in meeting the long-range goal of providing accurate and current information about the natural and cultural resources within the NCA.
>
> * Establish a mechanism for facilitating scientific research and education to occur within the NCA.

The New Mexico Museum of Natural History is a potential cooperating agency for the Field Learning Center. The museum conducts programs that fall into the category of public education, including a rural science program and the "Explorations" program. The rural science program provides hands-on learning experiences to school children and teachers in rural communities. The "Explorations" program offers classes on natural resource study to the public. This established environmental education program could help young people in the region develop an appreciation for the NCA's resources.

The BLM has no plans to construct a facility to accommodate a Field Learning Center. Instead, the BLM will work cooperatively with The Nature Conservancy, the Trust for Public Land, and private individuals to acquire available suitable properties within or adjacent to the NCA.

MARKETING

The American public is the primary customer of the BLM. Through marketing, the BLM can both gain support for resource management and foster responsible resource stewardship. Marketing is a way BLM can help the public understand that managing the natural and cultural resources of the NCA is a complex responsibility in which they are encouraged to participate fully. Effective marketing can lead to an enhanced image and enhance the professional credibility of the BLM.

METHODS

Effective interpretation requires a range of activities, techniques, and media in order to implement the NCA's interpretive program. These methods include: written publications such as maps and brochures, visual media such as slide programs, video tapes, films and photographs, both indoor and outdoor exhibits, informational signs, and personal services such as guided tours, demonstrations, and classes. All these methods will be employed to implement individual elements of this plan.

Section 5
Proposed Management Prescriptions and Actions

Management prescriptions and actions for interpretation and public education are listed in Table 9-1.

TABLE 9-1
SUMMARY OF MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR INTERPRETATION AND PUBLIC EDUCATION

		Affected Environment	
Management Prescriptions and Actions	NCA Unit	Natural (BLUs)	Human
Interpretation & Information			
Establish Guidelines For Interpretation	CU	All	Interpretation will influence human behavior
*Finalize draft interpretive prospectus			
*Use themes to develop the interpretive objectives generated during planning process			
Establish Onsite Interpretive Programs			
La Ventana			
*Develop interpretive panel	CU	ABI	Site receiving high use
*Conduct special tours and programs	CWU		
Orientation Kiosks			
*Develop information on points of interest, facilities available, safety, & activities & events w/in NCA	All	ABHE	Information received prior to entering the resource
Dittert Site			
*Develop interpretive information for trailhead about cultural resources, human use of the region, wilderness, low-impact visitor use, & safety	CU CWU	BI	Appropriate cultural resource for interpretation
*Develop site bulletin			
*Conduct special tours and programs			

TABLE 9-1 -- CONTINUED

Management Prescriptions and Actions	NCA Unit	Affected Environment	
		Natural (BLUs)	Human
West Malpais Trailhead			
*Develop & post trailhead information about wilderness, low-impact visitor use, & safety	CU WMWA	A	Access to West Malpais Wilderness
South Big Narrows			
*Finalize draft interpretive prospectus	CU	BF	Access to Cebolla Wilderness
*Use themes to develop the interpretive objectives generated during planning process*Develop & post trailhead information about wilderness, low-impact visitor use, & safety	CWU		
Roe Homestead			
*Develop interpretive information for trailhead highlighting history of homesteading in area & human use of land	CU CWU	B	Example of historic homestead for interpretation
*Develop site bulletin			
*Conduct special tours and programs			
Continental Divide National Scenic Trail			
*Develop interpretive information for at two trailheads, highlighting natural resources, cultural-historic resources, safety, & low-impact visitor use	CU COC	ABC FGH	Diverse ecosystems & interpretive opportunity
Wildlife Viewing Area, CR 42			
*Develop interpretive panel highlighting natural resources, wildlife, landscape, geology, & landforms	CU COC WMWU	AC	Opportunity to view pronghorn
Interpretation of Other Cultural Resources			
*Develop onsite interpretive trail at BLM Ranger Station to cultural resources, including prehistoric reservoir	CU	ABI	Appropriate for onsite interpretation
*Identify cultural resources w/public interpretation potential (e.g., Cebolla Canyon Complex, suitable homesteads) & manage them to maintain potential	CU COC CWA	ABI	Need to identify other locations if visitation increases
Encourage respect for Native American viewpoints			
*Develop interpretive materials in cooperation w/interested local Native Americans	All	All	Opportunity to continue coordination w/Native American groups
Protect public health & safety			
*Inform visitors of potential dangers from using or drinking any surface waters or waters from any stock tanks	All	All	Recreators will find water in short supply
*Use directional signing along roads & trails where necessary	CU	All	Visitors unfamiliar w/access & direction

TABLE 9-1 -- CONTINUED

Management Prescriptions and Actions	NCA Unit	Affected Environment Natural (BLUs)	Human
Protect private property & water			
*Sign to inform visitors of owner status	All		Recreators will find water in short supply; waters are privately owned
*Inform visitors about policies on camping near stock tanks or springs	All		
Protect water quality			
*Inform visitors of potential impacts of camping too close to waters	All	All	Recreators are attracted to sites w/surface water
Establish Offsite Interpretive Programs			
*Construct Ranger Station	CU	BI	Human behavior can be influenced before contact w/NCA resources
*Include natural & cultural resource exhibits, audio visual programs, & interpretive trails; written information including maps, brochures, & books; ranger talks & guided hikes; & safety information			
*Cooperate w/NPS on development & operation of Multiagency Center	CU	A	
*Present cultural resources in exhibits in Multiagency Center & BLM Ranger Station	CU	ABI	
*Develop brochures that provide maps w/land status; legal access; low-impact use techniques for hikers, backpackers, horseback riders, mountain bikers, hunters, & other users	CU		Focus on offsite interpretation
*Staff Ranger Station & Multiagency Center w/ personnel to provide talks, hikes, & program development	CU		
*Use trained local groups & individual volunteers to assist in providing services	CU		
*Provide workshops for interested groups on natural resources, hunter safety, leave-no-trace camping techniques, & other themes as need is identified	CU	All	Human behavior can be modified by information & personal contact
Environmental Education & Scientific Research			
*Promote positive public land ethic	All	All	Visitors w/a land ethic will participate in resource conservation
*Develop environmental education action plan			
*Incorporate cultural resources into environmental education programs			
*Identify local contacts w/public & private schools			
*Assist teachers in developing lesson plans on ecology, natural history, cultural heritage, & conservation practices			
*Promote BLM's mission & the importance of public land users' role in conservation			

TABLE 9-1 -- CONTINUED

Management Prescriptions and Actions	NCA Unit	Affected Environment Natural (BLUs)	Human
Provide handson experience for young visitors			
*Develop interpretive displays that allow participation of visitors at BLM Ranger Station	CU	ABI	Hands-on experience enhances learning
*Provide sandboxes w/various animal "track makers"			
*Provide rock samples that illustrate different geologic processes			
Provide resource protection; enhance increased understanding of unique habitat, geologic, paleontologic features of NCA			
*Inform public about variety of wildlife habitats found in complex terrain & geology of Cerritos de Jaspe subunit	CU	CFG HI	Unique forest vegetation attracts campers & other recreators
*Inform public about unusual geologic & cultural aspects of La Rendija (Maxwell's Fault) & ancient lava flows under grasslands of unit	CU	AC	Proposed Continental Divide National Scenic Trail passes near this feature
*Inform public about unusual geologic & cultural aspects of Cerro Rendija, large shield volcano	CU COC	CDG	Close to NPS developments
*Inform public about geology & cultural aspects of sandstone cliffs	CWU	I	Accessible from NM 117
*Work w/Museum of Natural History in adult & youth education programs	CU	All	Museum has established programs; BLM & Museum have MOU
*Work w/interested groups to establish Field Learning Center for environmental education, ecotourism, & research purposes	CU	All	
Encourage scientific research			
*Establish & maintain contacts w/teaching & research institutes interested in scientific research in NCA	All		Information from scientific research can enhance resource management
*Use MOU, cooperative agreements, & other methods to encourage theses or other research projects that expand understanding of natural & cultural systems	All		
*Accommodate scientific research consistent w/BLM policy			
*Enter into agreements w/appropriate institutions to conduct research in area of La Rendija (Maxwell's Fault) & other areas of geologic & paleontologic interest			
*Reduce need for research involving collection or excavation of cultural sites by encouraging use of existing collections	All		
*Write up excavations from Arroyo Site & arrange for permanent curation of its artifacts	CU CWU	ABI	Information from previous research not yet compiled

TABLE 9-1 -- CONCLUDED

		Affected Environment	
Management Prescriptions and Actions	NCA Unit	Natural (BLUs)	Human
Provide handson experience for young visitors			
*Develop interpretive displays that allow participation of visitors at BLM Ranger Station	CU	ABI	Hands-on experience enhances learning
*Provide sandboxes w/various animal "track makers"			
*Provide rock samples that illustrate different geologic processes			
*Locate existing collections from previous research & compile copies of project records	All	ABI	
*Preserve long-term potential of cultural sites for scientific use	CU CWU	ABI	
*Restrict research involving collection or excavation at non-threatened sites (refer to Chapter 13)			Research can destroy or diminish scientific potential
Marketing			
*Promote positive public relations	All		Good communication w/public will result in greater services delivered
*Finalize draft marketing plan for NCA			
*Establish & maintain contacts w/local & regional news media			
*Ensure accurate information is published			
*Provide frequent news releases to local & regional news media about activities in NCA			
*Establish & maintain contacts w/community groups, chambers of commerce, convention centers, & local Native American groups			
*Develop slide programs for community groups, local & regional schools, & other interested parties			
*Make slide programs available to groups at every opportunity			
*Develop mobile displays to travel to local & regional fairs, museums, & other special events			

CHAPTER 10

Facility Development Plan

Chapter 10
Facility Development Plan

Section 1
Introduction

The rugged beauty and deeply rooted cultural heritage of the El Malpais landscape should be complemented by facilities that direct the visitor's attention to the NCA's resources. The goal of this plan is to establish guidelines for design consistency and visual quality that communicate a sense of place. These guidelines encourage such techniques as imitation of natural landscape patterns and minimizing the of disturbance to ecological and cultural resources during design, construction, and maintenance.

The specific facilities proposed for the NCA are discussed in Chapter 3 of this document. The following sections provide an aid to designers, contractors, BLM officials, and maintenance staff for visual quality, design consistency, and resource sensitivity in developing facilities. During actual design of roads and facilities, case-by-case variances of some of the recommendations may be made to implement the most practical design solutions.

Section 2
Facility Development Guidelines

A study of regional architecture should be made before schematic designs are developed for any large facilities. Building style and expression should reflect the Southwest and use passive solar design. Designers should consider using native materials. Finishes should be natural, using transparent stains in a color similar to natural materials. Buildings should be sited so that existing significant views and vistas are preserved. It is important to retain a feeling of openness.

Any structure proposed for the NCA should take advantage of available views, but also consider sight lines back to the structure. Placing a structure between an established or potential approach and a significant resource should be avoided. Native vegetation should be used to screen service areas as needed.

Structures will be the minimum size necessary to accomplish their function. Nonreflective materials and natural colors will be used where possible. Signs will be the minimum necessary to guide and educate the visitor, and trails will be properly designed and constructed to discourage off-trail use.

All existing and future facilities will be maintained at a high standard. Ease of maintenance should be a criterion in the design and construction of facilities. All facilities outside wilderness should be accessible to handicapped people.

Section 3
Major Public Facilities

The only building the BLM is proposing to construct within the NCA is the BLM Ranger Station along NM 117 (refer to Chapter 3). The El Malpais Ranger Station will serve principally as a visitor contact facility, providing orientation to the National Conservation Area, visitor services, and interpretation. A secondary function will be to provide a two-bedroom apartment and adequate office space for BLM staff.

The Ranger Station will be within 0.3 mile of NM 117 near the base of a sandstone ridge, and will take advantage of regional vistas to the northeast and west. Some outside space will be used to provide interpretive talks and exhibits as well as protection from the elements. Design should include security and safety features. Exterior materials will be of a texture and color that harmonize with the surrounding landscape. Interior finishes should appear as natural as exterior finishes. Hardware should have a bronze finish to permit natural aging. Furnishings should be largely of wood, with fabrics of southwestern motif.

Parking for visitors to the Ranger Station will be separate from employee parking. Parking areas will be screened from the entrance road, if feasible. Native shade trees should be planted to relieve the intense summer heat on vehicles where possible. Distinct spatial transitions should separate the parking area from the entrance area.

Pedestrian walkways should be spatially distinct from vehicular circulation and integrated into the landscape form. Safe walkways and paths should invite the visitor into well-defined use areas through a logical sequence of experiences and views. Natural features should dominate where feasible. Edges of use areas should be well defined. Exterior public spaces at the Ranger Station should be spatially distinct and offer sitting areas and other amenities to invite the visitor to relax and enjoy the blend of the facility and the natural environment.

Both environments should allow for growth without infringing on the site's function or affecting its architectural unity or aesthetics. Utilities and plumbing should be designed to allow for disconnection and rerouting for future expansion.

Covered orientation kiosks will be constructed along NM 117 and NM 53 that will direct visitors to facilities and attractions. The lines, form, texture, and color of the kiosks should not be visually distracting. Materials used to construct the kiosks should harmonize with the natural setting. Vehicular access must be designed to provide safe entrance and exit for visitors. Existing native vegetation or landscaping with native plants should be used for visual screening and shade. The location, design, and construction of the kiosks will be coordinated with the National Park Service.

Day-use facilities are proposed for construction at the South Big Narrows and La Ventana Natural Arch. A parking lot and trail have been constructed at La Ventana (refer to Chapter 3), development will be complete with trail improvement, installation of vault toilets, and construction of an interpretive panel. The visual experience at La Ventana should be maintained or enhanced by using vegetation to visually screen the vault toilets, and by surfacing the parking lot with material that blends visually with the dominant colors at the location.

The picnic area, vault toilets, and parking area at the South Big Narrows should be designed to remain visually subordinate to the natural environment. Safe entrance and exit to this location is critical; because the New Mexico Highway Department is proposing to realign NM 117, final design of these facilities should be delayed until the new alignment can be incorporated into the design.

Section 4

Trail System

Proposed trails include both wilderness loop trails and loop trails outside wilderness. Trailheads are an important component of the trail system, with six are proposed for the NCA. They are a prime contact point for the BLM to provide visitors with information and demonstrate a commitment to conservation and preservation of resources. Trailheads should be designed to be visually appealing, withstand the elements, function as visitor use data collection points, and provide information to the public land user.

Trailheads will be constructed to access wilderness trails at the South Big Narrows, the Dittert Site, and the West Malpais cherry-stemmed road. Trailheads to access portions of the Continental Divide National Scenic Trail will be constructed at the north end of the Chain of Craters (in the Continental Divide subunit) and near Cerro Brillante (in the Cerro Brillante subunit). The design of parking areas at trailheads should complement the topography. Arched or curvilinear layouts and small parking areas (rather than large asphalt areas) should be used to reduce perceived size. Trailheads designed for use by horseback riders should be large enough to accommodate trailer turnouts.

Trails should follow the natural contours where possible and have a minimum of signing. Abandoned motorized vehicle routes should be considered for use as trails where appropriate. Trails will differ depending on their location inside or outside wilderness. Rock cairns should be used to mark trails in wilderness where possible. Constructed trails inside wilderness should be no more than 24 inches wide. Outside wilderness, trails can be more clearly signed and constructed to a higher standard. In high-use areas, a hardened surface may be used.

Drainage of all trails is an important design element. This can be accomplished by tilting the trail to carry water across the trail with the least amount of concentration. Some water breaks and culverts may be required. Trails for horse use should provide a clearance of 10 feet above the trail.

Section 5
Proposed Management Prescriptions and Actions

Proposed facilities are listed in Table 10-1. For greater detail on proposed facility development, refer to Chapter 3. Also shown in the table are site planning and design considerations.

TABLE 10-1
SUMMARY OF MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR FACILITY DEVELOPMENT

Management Prescriptions and Actions	NCA Unit	Affected Environment Natural (BLUs)	Human
Provide Visitor Services, Expanded Recreation Opportunities, And Resource Protection			
*Construct kiosks at CU entrance points	CU	ABHE	Information will influence visitors' behavior before they enter the CU
*Construct BLM Ranger Station along NM 117 corridor NE of sandstone bluffs to provide parking, visitor information/reception, exhibits & sales, housing for seasonal employees/volunteers, & radio communications	CU	B	Opportunity to inform visitors & provide expanded services
*Develop safe drinking water at selected sites			
*Apply for water rights w/NM State Engineer	CU		
*Construct additional recreation facilities at La Ventana Arch, including interpretive panel, vault toilets, curbs & gutters at existing parking area, & upgrade of existing trail; install visitor counter along existing trail	CU CWU	I	Easily accessed area w/existing high use
*Develop recreation facilities at South Big Narrows to provide gravel parking lot for 6-8 vehhicles, 6-table picnic area for day use, trailhead to Cebolla Wilderness, vault toilets, & primitive 4-mile rim trail into Cebolla Wilderness	CU CWU	BF	Easily accessed area w/ existing use
*Construct all-weather access to Roe Homestead in mouth of Cebolla Canyon, 6-8 vehicle graveled parking lot, trailhead, & interpretive trail	CU	B	Example of historic homestead for interpretation
*Develop recreation facilities at Dittert Site & upgrade access; provide 6-8 vehicle graveled parking lot; build trailhead & approximately 1/4 mile of trail to site location	CU CWU	BI	Appropriate cultural resource for interpretation

TABLE 10-1 -- CONCLUDED

Management Prescriptions and Actions	NCA Unit	Affected Environment Natural (BLUs)	 Human
*Construct 2 trailheads to access Continental Divide National Scenic Trail in CU; construct graveled parking lots at trailheads; provide for equestrian use at southern trailhead	CU COC	ABC FGH	Trail crosses diverse ecosystems & provides expanded recreation opportunities
*Construct pullout for wildlife viewing along CR 42	CU WMWU	AC	Pronghorn antelope habitat
*Construct trail using existing vehicular ways w/trailhead to access West Malpais Wilderness, gravel parking lot, & equestrian facilities at end of cherry-stemmed road	CU WMWU	A	Provide access to West Malpais for primitive recreation
Protect Cultural Resources			
Avoid cultural resources rather than mitigating development- & use-related impacts	CU	All	
Inventory at least 1/4-mile radius around proposed visitor-use developments, considering potential secondary impacts	All	All	Cumulative impacts of casual collection by visitors can severely damage cultural resources
Protect Continued Use by Native Americans	All	All	
Avoid placing public use facilities in sensitive areas			
Use trail placement & other design factors to direct visitors away from identified sites of traditional cultural and religious activities			

CHAPTER 11

Wildlife Resources Management Plan

Chapter 11
Wildlife Resources Management Plan

Section 1
Introduction

The BLM is committed to protecting wildlife habitat as part of its multiple use program outlined in Fish and Wildlife 2000, a BLM planning and policy document designed to guide wildlife management into the year 2000 (USDI, BLM 1988a). Fish and Wildlife 2000 and BLM policy support protecting habitat to meet the requirements of all wildlife. This protection can be accomplished by completing projects that remove major limiting factors, maintaining or increasing habitat productivity, and enhancing public understanding of wildlife and its relationship to habitat.

The El Malpais legislation calls for the BLM to develop a Wildlife Resources Management Plan for the entire NCA. The overall intent of wildlife resources management for the NCA is to conserve, improve, and protect the area's complex pattern of habitats for the variety of wildlife it supports. The NCA supports over 30 species of mammals, more than 60 species of birds at least part of each year, and a variety of reptiles, amphibians, and invertebrates.

The BLM is charged with maintaining wildlife habitat while allowing other public land uses to continue in the NCA. The agency must also maintain the wilderness character of the Cebolla and West Malpais wilderness units and the Chain of Craters Wilderness Study Unit.

Management emphasis outside wilderness areas will be to enhance or maintain the attributes of the Biophysical Land Units (BLUs) to attain desired plant communities that will support the diversity of wildlife that currently exists in the region. Management emphasis in wilderness will be to conserve the variety of habitats present while providing visitor use and access, and to allow natural ecological processes to continue without manipulation by humans.

Section 2
Current Situation

The BLM presently lacks the information needed to set specific management objectives for wildlife habitat in the same detail as other resources addressed in the GMP. Boundaries recently established for the NCA include areas that have not been surveyed for habitat, or are not part of a developed Habitat Management Plan (HMP). Only a partial list of special habitat features is available, limiting the analysis needed to evaluate the need for specific management prescriptions. In some cases, inventory will be needed to develop management prescriptions that will maintain the diverse habitats Congress recognized as one of the NCA's natural resources.

BLU zoning is especially useful to wildlife habitat managers who lack inventory information. Wildlife habitats have four basic environmental components: topographic elements, soils, vegetation, and surface drainage. Twelve BLUs have been generated for the NCA on the basis of these same four attributes (refer to Map A).

Each BLU with its common soils, vegetation classes, and topographic elements represents a unique set of opportunities and challenges related to the management of wildlife habitat (refer to Table 1-4, Chapter 1). A particular BLU supports similar wildlife species, and responds to management actions in a similar manner regardless of where it is located. Therefore, the BLUs can be used to guide decisions about where and how habitat enhancement, maintenance, and protection measures should be implemented. The BLUs help managers to determine the management emphasis likely to be effective in a particular region of the NCA. All the planning prescriptions and actions in this Wildlife Resources Management Plan have been generated using the BLUs as the basis for recommendations.

BLU zoning is comparable to the standard habitat site descriptions developed in 1980 for portions of the NCA through the Integrated Habitat Inventory Classification System (IHICS). A complete list of vertebrate species likely to occur in the NCA is found in Appendix G. This appendix provides specific information about what species are likely to occur in each Biophysical Land Unit (BLU), and what special habitat features or attributes of that BLU are important to each species.

At a later date a Habitat Management Plan (HMP) will be prepared. Specific planned actions will be incorporated to provide detailed management guidance for achieving the objectives described in this Wildlife Resources Management Plan. Those actions will include existing and planned habitat improvement measures, implementation priority, sequence, estimated costs (including labor), and a cost-benefit analysis. Planned actions include the following categories:

1. Direct actions (prescribed fires, seedings, erosion control structures, fences, and water developments).

2. Supporting or facilitating actions (e.g., roads, cadastral survey, land exchanges, site survey, and design) to permit the direct action to be implemented, including costs and labor needs for the actions involved.

3. Mitigating or protecting actions (e.g., visitor management prescriptions to protect seasonally important wildlife habitats, reseeding of high-value forage species following disturbance at proposed facilities, development of food patches by woodland product permits).

Section 3

Elements Of This Plan

SPECIES MANAGEMENT

The BLM supports state management plans for those game species that state law defines to be of economic or public value. Species emphasized in the NCA because of interest by the State of New Mexico include pronghorn antelope, mule deer, elk, turkey, Abert's squirrel, quail, mourning dove, and waterfowl. Management objectives for these species reflect objectives found in the New Mexico Department of Game and Fish (NMDG&F) Operations Plan, 1987-1990. Other vertebrate species of high federal, state, or public interest include prairie dogs, raptors, non-game migratory birds, bears, cougars, and coyotes.

Hunting and trapping will continue in the NCA as regulated by the NMDG&F. NMDG&F manages the hunting seasons for mule deer, pronghorn antelope, black bear, turkey, mourning dove, waterfowl, and Abert's squirrel in the NCA. Access into wilderness units for hunting will be limited to foot or horseback.

The NCA offers potential habitat for a variety of special status species. Federally endangered species known or likely to occur in the Conservation Unit include bald eagles (which winter in the region), and peregrine falcons (which occur as occasional migrants). Prairie dog towns in the Conservation Unit have been surveyed for the endangered black-footed ferret. These surveys are ongoing.

Five species being considered for inclusion on special status species lists may occur in the NCA. Those species include the southern spotted owl, spotted bat, white-faced ibis, mountain plover, and ferruginous hawk. A list of special status species that include the NCA in their range, or are known or likely to occur in the NCA is found in Appendix H.

The BLM is considering reintroducing desert bighorn sheep (a state endangered species) into portions of the NCA, and supplementing the existing pronghorn antelope herd in other portions. A feasibility study to determine habitat quality and potential conflicts will be conducted by BLM in cooperation with the NMDG&F before any action.

SPECIAL USE AREAS

Each animal species requires three elements for its existence: food, water, and cover. Food and water are required to sustain the basic functions of growth, maintenance, and reproduction. Cover is vegetation, space, or topography used by wildlife for protection from predators or the extremes of weather.

A habitat is a place where an animal finds the required arrangement of food, water, and cover to meet its biological needs. Different species of animals require different combinations of these three elements. Within the National Conservation Area, lack of certain habitat attributes may limit wildlife species occurrence in otherwise suitable habitat.

Certain habitats are especially important to wildlife because they are in limited supply, provide essential combinations of habitat features, or are necessary during seasonal migrations or birthing. Those important areas are termed "special use areas." BLM policy provides protection for such areas, especially riparian habitat and habitat for special status species.

BLM policy encourages management of raptor habitats on public lands by incorporating habitat and prey management. The BLM recognizes perpetuation of waterfowl diversity and abundance as an international resource, and encourages the management of wetlands and habitats such as playas and large retention dams on public lands for this purpose.

In habitats with brush and woodland components, maintenance of snags, dead and down trees, slash piles, and old growth components will be considered. In areas where the soils are deep enough to support burrowing mammals, management will seek to maintain appropriate habitat. The forage needs of wildlife will be balanced with range management needs in grasslands.

Two privately owned springs located in the Cebolla Wilderness Unit have potentially significant riparian habitat. Management of these springs to maintain or improve riparian habitat may be pursued with the landowners through cooperative agreements. Lands containing springs have been identified for acquisition in the BLM Land Protection Plan (refer to Appendix B for a summary).

WATER AVAILABILITY

Water availability for wildlife is limited in parts of the Conservation Unit, the Chain of Craters Wilderness Study Unit, and West Malpais Wilderness Unit. Several wildlife waters and exclosures have been completed in various areas to benefit wildlife. A list of completed wildlife waters and exclosures, their locations in the NCA, and the game species each is designed to benefit is found in Table 11-1. Additional waters have been proposed for the Conservation Unit through the El Malpais Habitat Management Plan (USDI, BLM 1981), which projects in the western half of the NCA.

TABLE 11-1
COMPLETED WILDLIFE PROJECTS, EL MALPAIS HABITAT MANAGEMENT PLAN

Project Name	Location	Completion Date	Purpose
Bighole inverted umbrella #1	T8N, R12W Sec. 26, SWSE	1982	Improve mule deer habitat
Bighole inverted umbrella #2	T8N, R11W Sec. 30, SWSW	1982	Improve mule deer habitat
Bighole inverted umbrella #3	T7N, R11W Sec. 8, SESE	1982	Improve mule deer habitat
York inverted umbrella and exclosure	T6N, R12W Sec. 30, SWNW Sec. 30, NW	1982	Improve antelope habitat
La Rendija inverted umbrella	T8N, R12W Sec. 5, NESW	1982	Improve mule deer habitat
Cerro Americana parabolic guzzler & exclosure	T8N, R13W Sec. 11, NWSE Sec. 11, NWSE	1985 1984	Improve mule deer habitat

TABLE 11-1 --COMPLETED

Project Name	Location	Completion Date	Purpose
Laguna Brillante exclosure	T6N, R13W Sec. 3, NESE	1982	Reduce livestock use of spring forbs to improve antelope habitat
Malpais Swale Exclosure	T7N, R12W Sec. 29, NWNW	1982	Reduce livestock use of spring forbs to improve antelope habitat
Cerro Chato exclosure and wildlife water	T7N, R13W Sec. 19, SWSE Sec. 17, SWNE	1983 1982	Improve mule deer habitat and protect water from livestock use
Laguna Americana exclosure	T8N, R13W Sec. 13, NWNE	1982	Protect riparian habitat by excluding livestock

Waters developed primarily for livestock also provide an important water supply for wildlife, especially in the wilderness units. Eight wells and five developed springs are located on private land within the boundaries of the Cebolla Wilderness unit. These wells and springs offer the main water supply for wildlife in the unit. Two of the springs were developed primarily to benefit wildlife but both have failed.

Eleven earthen tanks are scattered throughout the West Malpais Wilderness Unit. Two of the three windmill wells in the unit are located on private lands.

In keeping with wilderness policy, no additional waters will be developed within the wilderness units. BLM Range Improvement Management Plans (1990) cite specific management policies for waters in the wilderness units.

The NMDG&F Operations Plan calls for wildlife water to be available every two sections (2 miles) in mule deer and pronghorn antelope habitats. Existing water distribution and reliability as well as other management constraints will be reviewed when determining where additional waters will be placed. Map 3-6 in Chapter 3 shows areas where additional waters would be of benefit in habitat that is suitable for mule deer or pronghorn antelope.

DESIRED PLANT COMMUNITIES

The diverse habitats of the NCA support complex plant communities. A plant community is a unique combination of plants that reflect such environmental influences of a site as soil, temperature, elevation, slope, aspect, and rainfall (as they influence vegetation). A brief description of the plant communities that form part of each BLU is found in Chapter 1 and on Map A. A tentative list of plant species in the NCA is found in Appendix K. Future studies could identify plants of special status.

Maintaining or improving existing plant communities where feasible is basic to maintaining the health of habitats and the wildlife species that depend on them. Factors used to determine habitat condition for many game species include the presence or absence of key browse, cover, or forage species, as well as their availability, density, composition, and vigor. Other factors considered are soil stability and erosion potential. Two BLUs, B and I, have highly erodible soils that require consideration of possible erosion control measures.

The BLM establishes vegetation condition and trend studies on game ranges. Ecological range condition studies are also conducted in key areas on some grazing allotments. Additional key areas need to be identified in the NCA. If the condition and trend of browse, cover, or forage is determined to be unsatisfactory, the BLM can use many techniques to improve them. Specific monitoring techniques needed to determine habitat condition will be established as part of the Limits of Acceptable Change (LAC) monitoring system (refer to Appendix J).

The El Malpais legislation allows grazing to continue in the NCA. The balance between range and wildlife habitat management will be critical to achieving desired plant communities that benefit both.

Wildlife exclosures located within NCA boundaries provide protected vegetation for wildlife (refer to Table 11-1). No plans exist to remove these exclosures while grazing continues. BLM wilderness management policy limits vegetative manipulation to those actions necessary to restore natural ecological processes affected by human interference. Wildlife developments in wilderness units will be maintained with the minimum tool necessary to accomplish the task.

Section 4

Proposed Management Prescriptions And Actions

The proposed management prescriptions and actions for wildlife habitat management have been coordinated with the NMDG&F. Objectives developed in the El Malpais Habitat Management Plan (USDI, BLM 1981) have been evaluated and incorporated into GMP management prescriptions and actions as appropriate to the new philosophy outlined in the El Malpais legislation.

The prescriptions and actions for wildlife habitat management are designed to meet the requirements of the Sikes Act (PL 93-452). Funding from the State of New Mexico "Share with Wildlife" program will be sought for projects designed to protect the habitats of non-game species.

The emphasis of these prescriptions and actions include maintaining the complex patchwork character of existing habitats, optimizing water resources available to wildlife, ensuring protection of special status species, controlling erosion, and generating in the visiting public an understanding and appreciation of the variety of wildlife habitats found in the NCA.

TABLE 11-2
SUMMARY OF MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR WILDLIFE MANAGEMENT

		Affected Environment	
Management Prescriptions and Actions	NCA Unit	Natural (BLUs)	Human
Special Use Areas			
Restrict human impacts to areas occupied by wildlife for breeding, birthing, migration, cover, & winter use	All	All	
Survey to identify these areas before conflicts occur Make management decisions that deter conflicts before they occur			Consider sensitive areas when creating trails; redirection of recreators may be necessary
Restrict human impacts to wildlife during sensitive times of their life cycles (birthing, breeding, migration, winter use)	All	All	
Implement seasonal restrictions before conflicts occur			Human activities can negatively impact wildlife
Protect patchwork character of existing habitats	All	CDJ	
Use fire to maintain patchwork & deter damaging fires			
Allow removal of dead & down wood for home use, opening areas of no more than 200 acres on west side of NCA			Removal of fuelwoods for home use will benefit habitat

TABLE 11-2 -- CONTINUED

		Affected Environment	
Management Prescriptions and Actions	NCA Unit	Natural (BLUs)	Human
Protect against loss of habitat through erosion	CU CWA		
Seed native species onto slopes identified as sensitive where soil loss threatens habitat		BI	
Monitor for erosion in sensitive areas		BI	
Encourage growth of cover species in drainages	CU CWU	B	Where erosion occurs in designated wilderness, actions must be guided by wilderness policy
Use active erosion control, build check dams, or take other appropriate actions where necessary to prevent loss of cover			
Protect all drainages, wetlands, & playas	All		
Manage these areas as sensitive habitat		ABE	Potential conflicts exist between habitat management & range management
Protect species diversity	All		
Deter destruction of identifiable special use sites such as raptor aeries, snake dens, mammal burrows, wildlife trees, down rotting logs, prairie dog towns		All	
Survey to determine old growth areas that may be managed for southern spotted owls		GHIJ	May need to educate allottees & recreators about special use sites
Species Management			
Continue cooperation w/NMDG&F in managing game species	All		
Continue to provide input to NMDG&F regarding hunting & trapping	All	All	Recommended population sizes should attract hunters, photographers, & other wildlife viewers
Pursue cooperative agreement(s) to consider feasibility of reintroducing desert bighorn sheep		I	
Manage forage & browse condition to support recommended population sizes of species regulated by NMDG&F, as stated in their Operations Plan (1987)		All	
Enhance water availability			
Maintain existing wildlife waters & exclosures		ACD HIK	
Conduct inventory to determine where additional waters may benefit wildlife		All	
Develop additional waters for wildlife in areas where available waters are more than 2 sections (miles) apart (refer to Map 3-6)		ACHK	

TABLE 11-2 -- CONCLUDED

Management Prescriptions and Actions	NCA Unit	Affected Environment Natural (BLUs)	Human
Maintain visible BLM presence through patrols	All	All	Encourage positive interaction among wildlife, hunters, & other visitors
Continue "Operation Respect" during hunting season	All	All	
Protect songbirds, insectivorous birds, raptors, & special status species	All	All	
Develop cooperatively funded management efforts w/NM "Share with Wildlife" program			
Survey for habitat to protect & maintain it			
Protect hole-nesting wildlife			
Deter cutting of dead standing wildlife trees	All	CDG HIJK	Recreators & home fuelwood permittees must be discouraged from cutting such trees
Survey for old growth and limit fires to maintain habitat		GHIJ	
Manage old growth to recruit live-trees for hole-nesting wildlife			
Protect waterfowl populations & diversity	All		
Protect playas, large stock ponds, & wetlands through cooperative agreements w/ private owners or allottees		ABCE	
Acquire private lands contiguous w/NCA that contains waterfowl habitat			
Protect raptor populations	All	All	Many raptors are easily disturbed by people
Survey to determine raptor nesting areas & discourage recreational use there			
Deter loss of habitat critical to raptor food supply		All	
Maintain prairie dog towns & burrowing mammal habitat		ABC	
Forage & Desired Plant Communities			
Protect range resource; enhance forage; increase cover, density, & frequency of desired forage species	All		
Maintain or improve forage while protecting plant species important to wildlife		All	Range management practices affect forage condition & wildlife habitat
Select key areas in each allotment for monitoring range condition & continue ongoing range studies			
Institute changes in management practices if or when monitoring indicates desired range condition has declined			

CHAPTER 12

Natural Resources Management Plan

Chapter 12
Natural Resources Management Plan

Section 1
Introduction

The El Malpais legislation requires that the BLM develop a Natural Resources Management Plan for the NCA. Nationally significant geologic features are prominent in the NCA. In addition, the variety of geology, terrain, and soils found in the NCA provides a complex mosaic of habitats for a wide range of plants and wildlife.

The complicated vegetation and wildlife support Native American uses by supplying materials for traditional and religious uses. The vegetation and wildlife also attract a variety of other visitors interested in recreation uses such as hiking, camping, hunting, birdwatching, and photography.

Pinon and juniper provide an important local supply of fuelwood and are highly regarded by area residents for home heat, although logging and commercial woodcutting were retired from use with NCA designation. Pinon nuts are valued by visitors and are also a food source for wildlife.

Section 2
Current Situation

AIR QUALITY

The El Malpais NCA is designated a Class II area under the 1977 Clean Air Act. The airshed over the NCA meets all New Mexico and federal air quality standards. Twenty years of meteorologic data are available for the region from stations located at El Morro National Monument (to the west of the NCA), San Rafael (on the northwest corner of the Neck subunit), and Grants (to the northeast of the NCA). A meteorologic station operated by the BLM is located in Little Hole in the Wall, near Cerro Rendija in the northwest portion of the NCA. This station provides 10 months per year of data on wind speed and direction, air and fuels temperature, and relative humidity.

Although the landscape in the NCA is varied, it is characterized by high ridges and peaks with open vistas, and wide open areas that offer distant views. The open rolling landscape of the West Malpais Wilderness Unit, with its low grass-shrub vegetation, provides the viewer with a 360-degree vista of horizons miles away. Any visible air quality degradation would be apparent. The El Malpais lava flow has the highest occurrence of lightning-started fires in the region. However, fires are usually less than 100 acres in size, so smoke from them would only temporarily impact air quality.

WATER QUALITY AND AVAILABILITY

In the El Malpais legislation, the BLM was granted water rights sufficient to operate the NCA. However, those water rights must be applied for from the New Mexico State Engineer. Water rights in the water basin beneath El Malpais are presently being adjudicated. The BLM must accept the adjudication, which will consider the previously existing rights of other water users in the basin.

Visitor use resulting from designation of the NCA will require development of some waters. The quality of local water is variable and uncertain. Water quality will need to be tested at regular intervals for public health parameters, as outlined in the New Mexico water quality control regulations.

Two flowing springs located on private lands within the NCA have been developed for wildlife under agreements with the property owners. All existing surface waters have been developed for cattle or wildlife and have not been tested for public use. Several windmills in the NCA have been constructed for range management by allottees.

Private springs and several large stock tanks located in the Brazo subunit of the Conservation Unit would be attractive to recreators. Camping near these facilities could result in conflicts with wildlife and grazing operations, as well as degradation of water quality through increased siltation, enrichment, and bacterial contamination from human waste.

Five windmill wells and four spring developments located on private lands in the Cebolla Wilderness Unit may be attractive to recreators. Two windmills located on private land and one on public land in Big Hole in the Wall (part of the West Malpais Wilderness Unit) were developed for range management. The quality of these waters is unknown.

A line camp including a house and corrals associated with one windmill may attract visitors. In keeping with the wilderness management policy, no waters will be developed for visitor use within the boundaries of the wilderness area. Visitors to the NCA should be warned that water quality is unknown and that no waters should be considered safe for drinking.

GEOLOGY

One reason Congress cited for designating the National Conservation Area was the nationally significant geologic features in the area. The NCA surrounds the El Malpais lava flow, now designated a National Monument under the management of the National Park Service (NPS). Outstanding geologic features found in the NCA may attract a variety of visitors.

Cerro Rendija is a large shield volcano located along CR 42, in the northwest portion of the Conservation Unit (Continental Divide subunit) (refer to Map B). Further south, CR 42 provides access into the Chain of Craters Wilderness Study Unit, the West Malpais Wilderness Unit, and the Cerro Brillante subunit of the Conservation Unit. The Chain of Craters is a series of volcanic cones and craters aligned along a large-scale zone of structural stress. It is associated with the Zuni-Bandera volcanic field. A noticeable fault line located in the Cerro Brillante subunit, La Rendija, forms a crack in the earth more than a mile long and over 30 feet deep.

Fractures and fissures within the older lava flows in the unit, as well as certain sedimentary rocks, may contain animal and plant material that has accumulated over thousands of years. This paleontologic material may provide information about the area's past climatic conditions or other scientific data. Locations in the Conservation Unit that contain such material should be protected for scientific research purposes.

The West Malpais Wilderness Unit and the Cerro Brillante subunit are characterized by an open rolling landscape of ancient lava flows 1 to 3 million years old. The northern and eastern boundary of the West Malpais Wilderness Unit abuts the younger lavas of the El Malpais National Monument.

In the West Malpais Wilderness Unit, Big Hole in the Wall is an island of ancient lava, now vegetated, that is nearly completely surrounded by younger lavas. It has figured in many tales of the Old West. Its historic use and unusual geologic setting make it an attractive destination for visitors.

The southeastern corner of the Conservation Unit is a country of sandstone buttes standing in wide grassy valleys. The terrain is broken, typical of the pinon-juniper breaks that characterize the New Mexico landscape in the minds of many.

The Cebolla Wilderness Unit, on the eastern side of the NCA, offers nationally significant geologic features, including the 300-foot sandstone cliffs forming a rampart along NM 117. The cliffs are broken by wide, flat-bottomed canyons and are crowned with open conifer forests. La Ventana Natural Arch, which attracts thousands of visitors each year, is formed from these cliffs.

Mineral exploration and development of public minerals were retired with designation of the NCA. About two thirds of the mineral rights in the NCA are now in federal ownership; acquisition of more is in progress. (Refer to Appendix E for a summary of the Land Protection Plan, which outlines the BLM's priorities for such acquisitions.)

NATURAL FEATURES

Natural features in the NCA include sensitive wildlife habitats, plants used by humans, geologic features (including paleontologic resources--discussed above), minerals (also discussed above), and visual resources.

Wildlife Habitat and Vegetation

Large areas of the NCA are a mosaic of meadows intermixed with clumps of pinons and junipers. Areas above 7,200 feet support outstanding specimens of alligator bark juniper. El Malpais lies in the northeastern extension of this interesting tree's range. The patchwork character of the NCA's vegetation offers a combination of cover and food for wildlife that makes it a valuable habitat throughout the year. (Refer to Chapter 11, Wildlife Resources.)

The terrain and the protective status provided by the wilderness designation make the Cebolla Wilderness Unit a potential site for reintroduction of bighorn sheep. The vegetation covering the rolling hills of the West Malpais Wilderness Unit and the North Pasture of the Conservation Unit consists of grass and low shrubs, making these areas good habitat for antelope.

An ancient lakebed located near the village of San Rafael provides a saline marsh habitat within easy view of NM 53 that is used by a wide variety of birds during migration.

Very small areas of classic ponderosa parkland exist at higher elevations in the NCA. Ponderosa parkland is characterized by widely spaced, large adult trees (more than 50 years old) in grassy meadows. This habitat offers a scenic landscape to visitors, and an important habitat for a variety of wildlife species. Ponderosa parkland relies on fire to maintain itself in natural condition.

Meadows in the northwestern part of the Conservation Unit are beginning to fill in with stands of young pinon, oak shrub, and young ponderosa pine. These stands would be ideal for Christmas tree cutting. Such selective cutting of small trees in these areas would help preserve the important patchwork character of this habitat, by retaining the meadows.

The Cerrito de Jaspe subunit of the Conservation Unit is located to the north of the National Monument just south of NM 53. This subunit has a broken landscape caused by interdigitating fingers of lava and sandstone. Small clusters of vegetation unusual at this elevation grow along the edge where these two rock types meet.

The nearby Zuni Mountains extend plant types such as Douglas fir and aspen into the Cerritos de Jaspe subunit. The high ridges and cinder cones offer views of the newer lava flows, the Chain of Craters Wilderness Study Unit, and the Sandstone Bluffs that rise in a rampart along the west side of the Cebolla Wilderness Unit.

The Cebolla Wilderness Unit is a network of sandstone buttes topped with basalt standing in wide, grassy valleys. This broken terrain, with its open mixed conifer vegetation so typical of New Mexico in many people's minds, offers expansive views into other parts of the NCA and National Monument.

Many of the valleys in the NCA have been farmed in the prehistoric and historic past. Farmsteads are evident to the careful observer and provide insight into the westward expansion of the United States in the 1800s. Historic logging sites also remain. (Logging was retired as a resource use with designation of the NCA.) In some canyons, entire towns have vanished with almost no trace.

Visual Resources

The Rio Puerco RMP established a Class II visual management category for the NCA. The Cebolla Wilderness Unit and the West Malpais Wilderness Unit are managed as Class I, according to BLM policy. Class I designation provides primarily for natural ecological changes. The Class II category contains areas having high scenic quality, and was arrived at through an assessment of the visual components of landform, color, texture, and vegetation. These components are combined with the existence of unique visual attributes and few human intrusions.

Visually, the NCA contains a diverse range of form, line, texture and color complements and contrasts. There are areas of rolling, shrub-punctuated grasslands that exhibit subtle color and texture variations against open, undulating form and line. Panoramas containing massive landform structures, with wide variances in color and texture, exist amongst the cinder cone landscape along the continental divide. Extreme contrasts of texture, color and slope occur where coarse lava flows meet angular sandstone bluffs. There are also unique groupings of interspersed ecotypes, all within short distances, that offer a visual patchwork of color variance, form contrasts, and texture change.

The NCA is considered visually sensitive because there is a high level of public knowledge and concern for the area, with an increased frequency of travel throughout the NCA. For Class II visual management, any changes in basic visual elements (form, line, color, texture) caused by a management activity, should not be evident in the landscape. For Class I, any contrast created within the existing environment must not attract attention.

The existing visual resources in the NCA have been done by examining the natural visual attributes of each BLU. The visual qualities of each BLU are derived from the composite visual effects of its form, line, color and texture components. These components are expressed by the attributes of landform (terrain), vegetation/landcover, soils, and surface waters. Each BLU, based on the composition of its attributes, has an inherent capability to absorb a different level of visual manipulation, without significantly affecting its visual character.

Each BLU has a different combination of landscape complexities that comprise its visual resources, including: variations in slope and frequency of change in slope; variations of form, line, and volume in space; variations and contrasts in color and texture; vegetative screening potential; vegetative regeneration potential; and the degree of soil and rock contrast. The relative ability of each BLU to absorb the visual change is called Visual Absorption Capability. Refer to Table 1-6 in Chapter 1. Overall, the NCA has a moderate ability to absorb visual change. However, each BLU contains its own discreet set of visual attributes that are important to analyze when considering any visual changes.

Two important scenic corridors in the NCA are located along NM 117 and NM 53. The visual sensitivity and high visibility of these corridors to the visiting public warrant the pursuit of scenic easements along both.

Section 3
Management Prescriptions And Actions

The following management prescriptions and actions have been developed to conserve the varied natural resources found in the NCA while allowing recreational opportunities, range and wildlife habitat management, and maintenance of the wilderness character of designated wilderness units of the NCA. Management emphasis will be on maintaining the existing resource conditions, and generating in the visiting public an understanding of the significance of these natural resources.

TABLE 12-1
SUMMARY OF MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR NATURAL RESOURCES

		Affected Environment	
Management Prescriptions and Actions	NCA Unit	Natural (BLUs)	Human
Air Quality			
Protect air quality	All	All	
Monitor select air quality parameters under cooperative agreement w/NPS			
Water Quality & Availability			
Protect public health			
Inform visitors of potential dangers from using or drinking any surface waters or waters from any stock tanks	All	All	Recreators will find water in short supply
Develop safe water supply for visitor use at selected sites in NCA & monitor water quality at regular intervals	CU	BI	Visitors will expect safe water supply to be available
Protect private property & water	All		
Sign to inform visitors of owner status		All	Recreators will find water in short supply
Inform visitors about policies on camping near stock tanks or springs			

TABLE 12-1 -- CONTINUED

Management Prescriptions and Actions	NCA Unit	Affected Environment Natural (BLUs)	Human
Protect water quality	All		
Inform visitors of potential impacts of camping too close to waters		All	Recreators are attracted to sites w/surface water
Acquire adequate legal water rights for unit	CU		
Apply for water rights w/ the NM State Engineer		BI	Adequate water supply needed for visitor use
Natural Features			
Provide resource protection, enhance increased understanding of unique habitat, geologic & paleontologic features of NCA			
Inform public about variety of wildlife habitats found in complex terrain & geology of Cerritos de Jaspe subunit	CU	CFGHI	Unique forest vegetation attracts campers & other recreators
Inform public about unusual geologic & cultural aspects of La Rendija (Maxwell's Fault) and the ancient lava flows under grasslands of unit	CU	A	Continental Divide National Scenic Trail may pass very near this feature
Inform public about unusual geologic & cultural aspects of Cerro Rendija, large shield volcano	CU	CDG	Close to NPS attractions
Inform public about geology & cultural aspects of sandstone cliffs common to Brazo subunit and La Ventana Natural Arch	CWU CU	I	Arch & sandstone cliffs attract many day-use recreators
Enter into agreements w/ appropriate institutions to conduct research in area of La Rendija (Maxwell's Fault) & other areas of geologic & paleontologic interest	CU	All	
Protect pinon pine			
Deter cutting of selected mature live trees	All	CH	Cutting of fuelwoods for home use should only provide habitat protection
Control pinon nut collecting to ensure adequate seed crop	CU	CH	Collecting by recreators, Native Americans expected to increase
Protect all drainages, wetlands, & playas	All		
Manage these areas as sensitive habitat		ABE	Potential conflicts between habitat management & range management
Establish cooperative agreements w/allottees to limit cattle access			
Acquire private lands w/in NCA boundaries that contain these resources			
Protect patchwork character of existing wildlife habitats	All		
Use fire to maintain patchwork & to deter damaging fires			

TABLE 12-1 -- CONCLUDED

Management Prescriptions and Actions	NCA Unit	Affected Environment	
		Natural (BLUs)	Human
Allow removal of dead & down wood for home use, opening areas of no more than 200 acres on west side of unit	CU	CDJ	Removal of fuelwood for home use will benefit habitat
Monitor for erosion in sensitive areas		BI	
Use fire to maintain diversity	All		
Develop fire management plan which allows for controlled fuelwood reduction through home use sales & controlled burns in high fuel buildup areas; plan allowable burn zones for maintenance or enhancement of wildlife habitat & watershed rehabilitation; fire objectives would be tailored to wilderness management criteria		All	Fire is a natural process which has been manipulated
Protect scenic quality along NM 117 and NM 53	All		
Acquire scenic easements		All	Visitors expect a predominantly natural viewshed
Ensure all developments outside wilderness areas blend in w/natural environment according to Class II Visual Management Resource standards, & w/in wilderness areas to Class I standards	All	All	
Assess all proposed projects using a visual contrast rating process			
Consider the visual absorption compatibility of the BLU being affected by any proposals			

CHAPTER 13

Cultural Resources Management Plan

Chapter 13
Cultural Resources Management Plan for the El Malpais National Conservation Area

Section 1
Introduction

The El Malpais National Conservation Area (NCA) includes a wealth of archeological and historic remains. Not only are these sites important from a scientific point of view, but some are well preserved and could be of considerable interest to the general public. Prehistoric remains in the NCA are also very important to local Native Americans, who recognize them as ancestral places.

Recognizing the importance of these resources, the Rio Puerco Resource Management Plan (RMP; USDI, BLM 1986) designated El Malpais as a Special Management Area. The RMP stressed the need to combine conservation of the cultural resources with careful scientific investigation.

The El Malpais legislation recognizes these same concerns. It emphasizes the rich cultural resources as one of the important values to be preserved, and directs the BLM to write a management plan with particular emphasis on the preservation and long-term scientific use of archeological resources. It also requires the BLM to establish a continuing program of education about El Malpais and its resources.

Section 2
Previous Research

Archeological remains have been reported in the El Malpais NCA since the middle and late 1800s, but intensive study of this area did not begin until the late 1940s and early 1950s. During this time, Reynold Ruppe and Alfred Dittert directed reconnaissance and excavation along the western flanks of Cebollita Mesa. Most of what is known about the prehistory of this area comes directly from these studies.

Some additional archeological survey and excavation was done in the 1970s, prior to the construction of New Mexico Highway 117. Also in the 1970s, the BLM sponsored a reconnaissance survey throughout the area east of NM 117 and a more intensive survey in the Spur subunit of the Conservation Unit.

Most recently the Office of Contract Archeology, working under a BLM contract, completed a sample survey of approximately 60 sections within the NCA. Preliminary results of this project are becoming available.

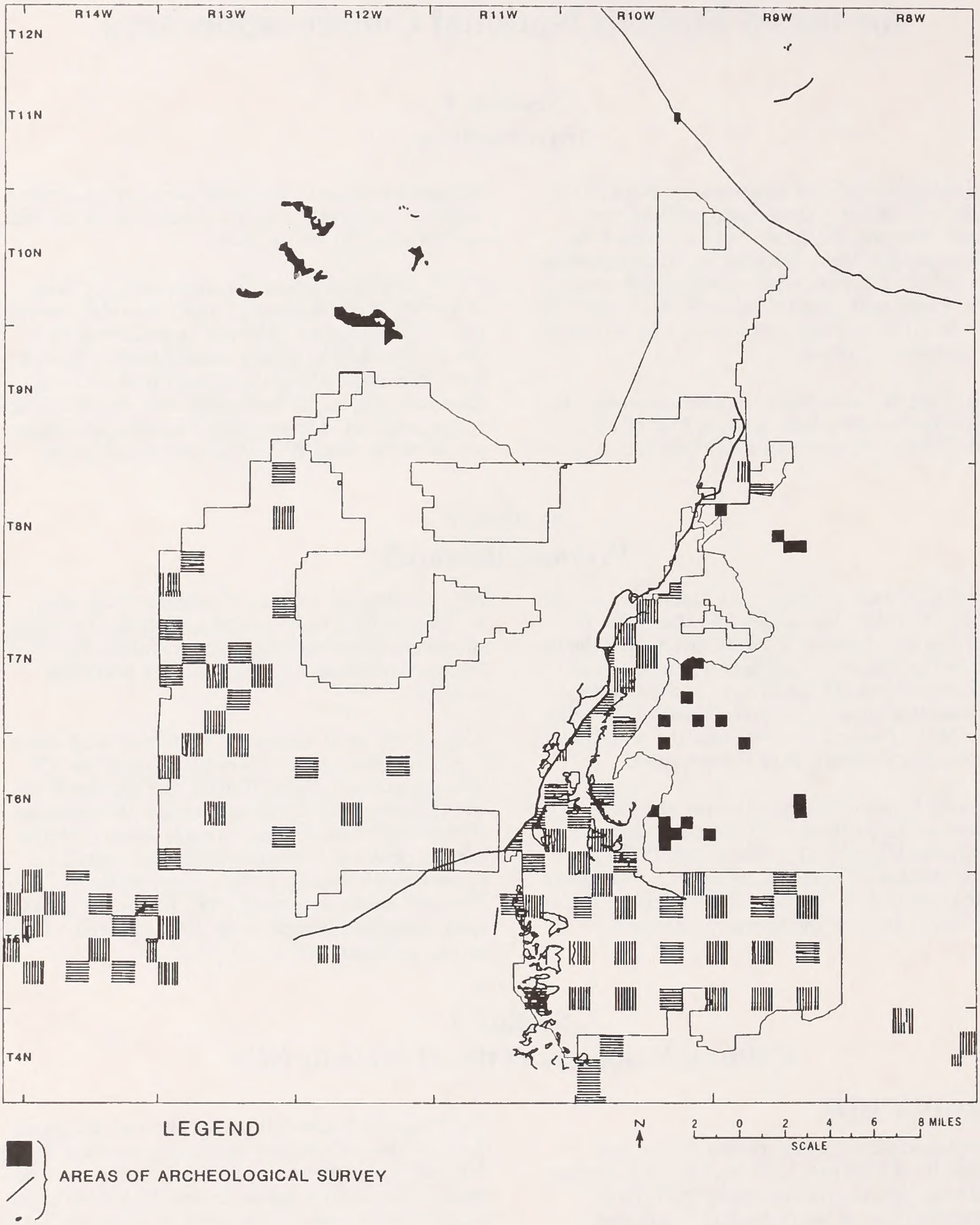
About 6,760 acres within the NCA have been inventoried in some manner for cultural resources. Of these, approximately 3,838 acres (1.5 percent of the NCA) have been inventoried to Class III standards. (Refer to the Glossary for an explanation of the inventory classes for cultural resources.) Map 13-1 shows the distribution of the surveys within the NCA. Map 13-2 shows how much Class III inventory has been completed in each of the NCA subunits. These figures are summarized in Table 13-1.

Section 3
Cultural Resources of the El Malpais NCA

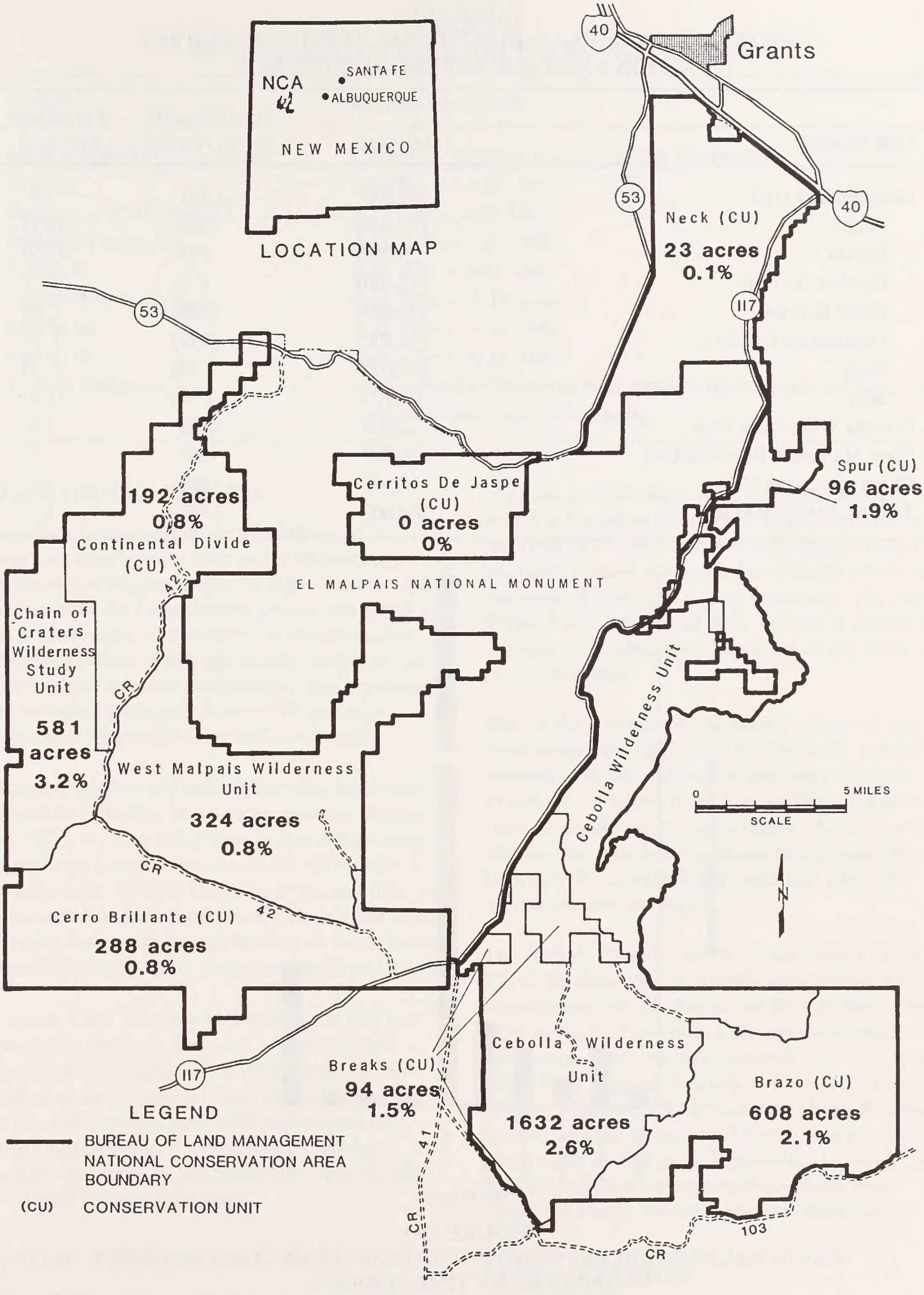
INTRODUCTION

Although earliest use of the region around and including the El Malpais NCA may have taken place 12,000 years ago, the overwhelming majority of archeological sites in the NCA date to a period between A.D. 1050 and 1200 (Pueblo II-Pueblo III). This is illustrated graphically in Figure 13-1, which shows the number of site components found during the recent sample survey in El Malpais. The time periods are characterized as shown in Table 13-2.

The Pueblo II-Pueblo III period accounts for more than half the prehistoric components recorded during this survey; this pattern likely holds for the NCA as a whole. The sections below discuss the history of the prehistoric cultures in El Malpais in more detail, and highlight some aspects of the archeological record that have important bearings on managing these cultural resources.



MAP 13-1
CULTURAL RESOURCES INVENTORY IN THE EL MALPAIS AREA



MAP 13-2
DISTRIBUTION OF CLASS III CULTURAL RESOURCES SURVEY
WITHIN VARIOUS SUBUNITS OF THE NCA

TABLE 13-1
DISTRIBUTION OF CLASS III CULTURAL RESOURCES SURVEY
WITHIN UNITS AND SUBUNITS OF THE NCA

Unit/Subunit	Total Acres	Total Class III Survey Acreage	Percentage Surveyed
Conservation Unit	141,800	1,301	.9
Brazo	(29,400)	(608)	(2.1)
Breaks	(6,300)	(94)	(1.5)
Cerritos de Jaspe	(12,800)	(0)	(0)
Cerro Brillante	(36,400)	(288)	(.8)
Continental Divide	(24,200)	(192)	(.8)
Neck	(27,600)	(23)	(.1)
Spur	(5,100)	(96)	(1.9)
Cebolla Wilderness Unit	62,800	1,632	2.6
West Malpais Wilderness Unit	39,700	324	.8
Chain of Craters Unit	18,300	581	3.2
TOTALS/AVERAGE	262,600	3,838	1.5

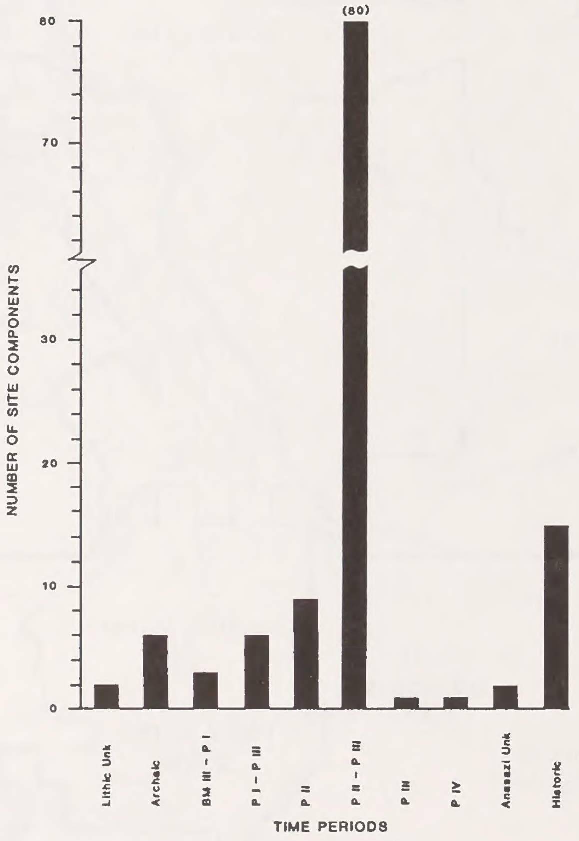


FIGURE 13-1
CULTURAL RESOURCES FOUND IN THE EL MALPAIS CLASS II SURVEY
GROUPED BY TIME PERIODS

TABLE 13-2
ARCHEOLOGICAL PERIODS IN THE EL MALPAIS NCA

Period	Description or Date
Lithic Unknown Components	Cannot be dated on basis of current information.
Archaic	5500 B.C. to A.D. 700
Basketmaker III-Pueblo I	A.D. 700 to A.D. 850
Pueblo I-Pueblo III	A.D. 800 to A.D. 1200
Pueblo II	A.D. 850 to A.D. 1100
Pueblo II-Pueblo III	A.D. 1050 to A.D. 1200
Pueblo III	A.D. 1150 to A.D. 1300
Pueblo IV	A.D. 1300 to A.D. 1600
Anasazi Unknown	Components fall between Basketmaker III & Pueblo IV times, but cannot be dated more specifically.

PALEO-INDIAN PERIOD

The earliest human use of the El Malpais NCA region may have been as long as 12,000 years ago, near the end of the last major Ice Age. This occupation, known as the Paleo-Indian period, was based in part on the hunting of animals that are now extinct. Archeological sites of this age usually consist of low-density scatters of stone artifacts; the sites are recognized as PaleoIndian only if projectile points or certain other diagnostic stone tools are found.

Although a number of Paleo-Indian sites have been recorded on Cebollita Mesa immediately to the east of the NCA, no sites with Paleo-Indian components have yet been found within the NCA. Given the proximity of the NCA to Cebollita Mesa and the occurrence of smaller numbers of Paleo-Indian sites to the east and south, a small number of Paleo-Indian components will likely be recognized within the NCA.

The recent Class II survey in the NCA did find two Paleo-Indian artifacts. One was a Midland-style projectile point found in the West Malpais Wilderness Unit as an isolated artifact. The other was the base of a Folsom-style projectile point found on a Pueblo (Anasazi) site. Undoubtedly it had been picked up elsewhere by the prehistoric Anasazi and carried back to their habitation.

ARCHAIC PERIOD

By about 7,500 years ago, the Ice Age had ended and the climate was becoming warmer and dryer. With shifts in climate came new economic and social strategies that were based on gathering a wide range of plants and hunting a variety of game animals. This period is known as the Archaic Period, and is characterized by a well-organized and complex round of migrations based on seasonal availability of a broad spectrum of plant and animal resources. The Archaic Period lasted until about A.D. 400 and is divided into five successive phases distinguished on the basis of projectile points.

Sites of the Archaic Period usually consist of scattered stone chips and tools. Occasionally, careful excavation yields evidence of pithouses or brush structures. Artifacts from Archaic Period sites include projectile points and scrapers. Archaic peoples also utilized rockshelters, where rare perishable artifacts as well as scientifically important plant and animal remains are found.

The Archaic Period is not well represented in the NCA. To date, only 20 Archaic components have been recognized, all of them on the east side of the NCA in the Conservation Unit and the Cebolla Wilderness Unit. Archaic components were expected in the West Malpais Wilderness Unit, the Chain of Craters Wilderness Study Unit, the Cerro Brillante subunit, and the Continental Divide subunit, where pinon abounds and game is plentiful. However, no Archaic components were found in these areas during the recent extensive archeological survey.

PUEBLO PERIOD

Late Archaic peoples had some knowledge of agriculture, but relied only casually on crops for their livelihood. By about A.D. 700, settlements of people who relied heavily on agriculture were common. These groups raised corn, beans, and squash, and supplemented their diets by hunting and gathering wild plants. These people are known as the Pueblo or Anasazi, and their development can be traced through time right up to the present day pueblos. Sites of the Pueblo Period include rock art (both petroglyphs and pictographs), pithouses, remains of masonry and jacal buildings (refer to the Glossary), and simple artifact scatters.

The Pueblo Period can be divided into eight successive phases based upon changes in pottery styles and other characteristics. Earlier phases are characterized by ceramic and lithic scatters and occasionally by pithouses. By about A.D. 850, small surface houses were predominant, sometimes grouped around a great kiva. Later, around A.D. 1050, these communities sometimes included a large building with certain Chacoan characteristics such as massive masonry, extremely large rooms, blocked-in kivas, and prehistoric "roads."

After A.D. 1150, a shift occurred from small individual family residences to larger multifamily dwellings. This trend culminated in a handful of large pueblos with 100 to 400 rooms. By around A.D. 1400, most of the NCA had been abandoned as an area of primary residence. Undoubtedly it continued to be used by Native American peoples for hunting, gathering, and religious purposes.

Two very striking patterns are apparent for the Pueblo Period. First, as illustrated in Figure 13-1, the overwhelming majority of sites date to the late Pueblo II and Pueblo III periods (between A.D. 1050 and 1200). Probably some older Anasazi sites belonging to the Basketmaker III, the Pueblo I, and the Early Pueblo II periods are buried and thus harder to find than the later sites. However, the pattern is so strong that little doubt exists that the major period of Anasazi occupation in the NCA was during Late Pueblo II and Early Pueblo III times. (Late Pueblo III probably also saw a large population in this area. This is not apparent in Figure 13-1, because during Late Pueblo III times people lived in a few very large pueblos.)

The second striking pattern is the strong concentration of Anasazi sites along the NM 117 corridor. Map 1-3 in Chapter 1 is an isopleth map that shows site densities estimated from the Class II El Malpais NCA survey. This map shows extremely low site densities in the Chain of Craters Wilderness Study Unit, the West Malpais Wilderness Unit, the Continental Divide subunit, and the Cerro Brillante subunit to the west of NM 117. Similarly low densities for habitation sites are also assumed for most of the National Monument. On the east side of NM 117, very low site densities are estimated for the Brazo subunit. Extremely high site densities (ranging to estimates of over 60 sites per section) are indicated for portions of the Cebolla Wilderness Unit, the Spur subunit, and the Breaks subunit.

The Anasazi sites are of concern to local Native American groups, especially the Acomas. The sites are recognized as the past homes of Acoma ancestors and can be sources of spiritual power and rejuvenation. The Acomas also collect potsherds from these sites to be crushed and used as temper by contemporary Acoma potters.

Traditional Native American attitudes toward excavation of the Anasazi ruins are diverse. The Acomas feel strong ties to these sites and prefer that they not be disturbed. Disturbance directly related to the ongoing history of the Acoma people is accepted with some reluctance, but excavations that result from other construction, pothunting, or scientific investigation are strongly opposed.

The Zunis are interested in any avenues that can increase knowledge of their ancestors, including scientific investigation. However, in the NCA the Zunis recognize that most archeological remains pertain more to Acoma than to Zuni.

The Navajos view prehistoric ruins (and other abandoned habitations) as places of spiritual danger. They are concerned that disturbance of these places can cause misfortune, both to individuals and to whole peoples.

HISTORIC TIMES

Anglo-European use of the El Malpais NCA region began with the entry of Coronado in 1540. However, it was not until the construction of the Atchison, Topeka and Santa Fe Railroad through the malpais in 1881 that intensive Anglo-European use of the region began in earnest. Homesteading may have begun as early as 1916, but the development of the logging industry in the late 1920s really stimulated rural settlement in the NCA. Most historic sites in the NCA are sawmills, logging camps, and homesteads dating between the 1930s and the 1960s.

Section 4
Specific Use Allocations

Before cultural resources can be properly managed, decisions must be made about their intended use. Management of properties for public visitation, for example, could require a whole different set of objectives than management to preserve scientific values.

The BLM directives for cultural resources management planning (Manuals 1623, 8111, and 8131) establish a series of uses to which individual cultural properties or classes of cultural properties may be allocated. These categories are summarized in Table 13-3. The following sections discuss these use categories as they pertain to the cultural resources of the El Malpais NCA.

TABLE 13-3
MANAGEMENT CATEGORIES FOR CULTURAL RESOURCES

Management for Information Potential

1. Scientific Use
   - * These properties are generally available for scientific or historical investigation using currently available research techniques.
   - * Properties need not be conserved if appropriate research or data recovery is proposed.

2. Management Use
   - * These are properties allocated for consumptive experimental use, for purposes of measuring rates of deterioration, or for testing protection measures.
   - * Properties will eventually be destroyed or severely damaged to obtain specific information and aid in managing other cultural properties.

Management for Public Values

1. Sociocultural Use
   - * These properties contribute to maintaining the heritage or existence of a particular social and/or cultural group.

2. Public Use
   - * These are properties used for educational, recreational, or other similar uses by the general public; they are also used as interpretive exhibits or subjects of supervised participation in scientific or historical study.

Management for Conservation

- * These are rare or unusual properties that are to be protected from all land and resource uses, including scientific study, that would threaten their present condition.

Discharged from Management

- * These are properties no longer qualified for assignment to any of the above uses.
- * Recordation has exhausted potential for scientific use or properties have been completely destroyed.
- * Locations on the ground are no longer a constraint on any other land uses.

MANAGEMENT FOR INFORMATION POTENTIAL

The El Malpais legislation emphasizes cultural resources as one of the principal values in the El Malpais NCA. The legislation directs that these resources be managed with particular emphasis on the "preservation and long-term scientific use of archeological resources, giving high priority to the enforcement of the provisions of the Archeological Resources Protection Act of 1979 and the National Historic Preservation Act." This directive mandates management for information potential, placing a strong emphasis on the conservation of the cultural resources data base.

Scientific Use

The legislated mandate for long-term scientific use implies a strong emphasis on the preservation of the information content of archeological sites, but not to the point of prohibiting scientific investigation. Most archeological sites in the NCA are allocated to the scientific use category. The sites are to be available for scientific study, including investigations that result in physical site alteration. However, the management prescriptions and actions listed in Section 5 of this chapter place restrictions on scientific use, including a requirement for strong justification in many circumstances.

Most sites in the NCA that fall into the Historic and Unknown site classes will be managed for scientific value. These sites usually possess some information potential, but are not unique or of overriding importance. Therefore, they are to be generally available for scientific investigation using current techniques, even when such investigation would result in their physical alteration. Exceptions to this classification are those Historic sites that will be managed for public interpretation.

Paleo-Indian, Archaic, and Pueblo sites possess scientific value and it is important to conserve a substantial portion of these properties for future study. This does not mean absolute preservation of any particular site in these classes, but does require that the impact of any proposal for archeological study be carefully evaluated to determine its impact on the overall site class. For these reasons, under the Preferred Alternative most Paleo-Indian, Archaic, and Pueblo sites are provisionally allocated for scientific use, but restrictions are placed on research that would involve physical alteration of the property.

Exceptions to this classification include those sites that will be managed for public use. Scientific investigation of these properties will not be allowed if it will impair their suitability for public interpretation. Also, the Dittert Site Great Kiva is allocated to the category of "Conservation for Future Use." Scientific investigation that resulted in physical alteration of this property would not be allowed during the life of this plan.

The Pueblo of Acoma objects to the scientific use of any prehistoric sites within the NCA, as discussed in the preceding section. This objection conflicts directly with the legislated requirement to provide for long-term scientific use. Certainly any proposal for archeological research in the NCA must be sensitive to this issue, and must be closely coordinated with the Pueblo of Acoma and other Native American groups who have an interest in the NCA.

Management Use

None of the known sites in the El Malpais NCA are allocated for consumptive experimental use to obtain management information under either of the plan alternatives. However, non-consumptive studies (such as monitoring rates of erosion or rates of loss of surface artifacts to determine when proactive management actions should be initiated) are clearly appropriate.

MANAGEMENT FOR PUBLIC VALUES

The El Malpais legislation emphasizes protecting traditional cultural and religious sites, the need to provide access to these sites, and the need to protect the privacy of these places. For historic properties, the legislation stresses a continuing program of interpretation and public education.

Sociocultural Use

Sociocultural uses contribute to maintaining the heritage or existence of a specified social and/or cultural group. For the NCA, the groups that have expressed strong continuing ties to cultural resources are the Acomas, the Lagunas, the Zunis, and the Ramah Navajos. The El Malpais legislation and its congressional history direct the Secretary of the Interior to ensure "nonexclusive access to the conservation area by Indian people for traditional cultural and religious purposes." The American Indian Religious Freedom Act also directs the federal government to take special account of traditional American Indian practices.

American Indian religious use of the NCA occurs on a regular basis. However, the groups involved prefer that attention not be drawn to particular locations of importance. For this reason, no individual sites have been allocated to sociocultural use under either of the alternatives in this plan. Instead, the BLM will continue to coordinate planned actions and management of the NCA closely with these three groups. These Native American groups, especially the Acomas and the Zunis, have strong ancestral ties to many of the archeological remains in the NCA. Any public interpretation that results in physical alteration of these properties must be closely coordinated with these groups.

Public Use

The El Malpais legislation requires "a continuing program of interpretation and public education about the resources and values of the monument and the conservation area." Primary emphasis will be on off-site interpretation. However, two site areas will be actively promoted for public visitation, and four additional sites will be managed in ways that preserve their potential for public use. Also, all historic homesteads will be inventoried and evaluated to select examples suitable for public use.

The public will be invited to visit the Dittert Site (LA 11723), and off-site interpretive materials will be developed for this property. This site is a masonry pueblo that was partially excavated and later stabilized by the BLM. It embodies many aspects of Chacoan architecture and is associated with a great kiva, a prehistoric road, and a community of residential sites.

Encouraging public use of this area could accelerate loss of surface artifacts, although this damage can be mitigated through prior data recovery. At the same time, increased visitation is expected to reduce the likelihood of illegal excavation. One of the primary objectives of interpretation will be to foster a positive land ethic with special reference to cultural resources.

The other site that may be developed for public interpretation is a well-preserved prehistoric reservoir (OCA 411-10) located adjacent to the proposed BLM Ranger Station. This is an unusual feature that illustrates a technological adaptation to life in an arid environment. Archeological data recovery in the form of surface artifact collection would be necessary before opening the site to general visitation.

Two other prehistoric ruins would be managed to preserve their potential for public use. These are the Citadel or Promontory Site (LA 11651) and the Pinole Site (LA 11677). Both of these are large consolidated pueblos that represent the final stages of intensive prehistoric occupation in the NCA. Only two other sites of this nature are known in the vicinity of the NCA, both on Acoma Tribal Trust lands.

Rock art is relatively rare in the NCA and most examples are poorly preserved. Two panels (LA 10884 and LA 11709), however, are outstanding and should be managed to preserve their potential for public use. Both are within the Cebolla Wilderness Unit, and parts of one (LA 10884) are shown in Figure 13-2.

Historic homesteading is another theme in the NCA that lends itself to public interpretation. Present information about specific sites and their history is very incomplete, so selection of sites for public use is premature. An inventory should be made of homesteads in the NCA and their history researched by a professional historian. After these steps are completed, the Preferred Alternative suggests that all homesteads should be evaluated. Perhaps two or three examples outstanding for their physical remains or intrinsic historic value could be selected for public use. One example is the Roe Homestead, discussed in the Recreation Section of Chapter 3.

MANAGEMENT FOR CONSERVATION

Under the Preferred Alternative only one site, the Dittert Community Great Kiva, is allocated to the category of "Conservation for Future Use". This site is important because of the scientific information it contains. The site is unique in the NCA, is in stable condition, and is adequately protected from most forms of alteration by its inclusion in the NCA and the Cebolla Wilderness Unit. Other great kivas are known to exist on private, state, Indian, and federal lands outside the NCA. The only active threat to this site is believed to be illegal surface collection. Therefore, after collection of a systematic sample of surface artifacts, this site should be set aside for future scientific use using the techniques and research questions then available.

Section 5

Cultural Resources Management Program

MANAGEMENT OBJECTIVES

To carry out the use allocations described above, two broad management objectives have been formulated, supplemented by a series of management prescriptions and actions.

The first objective essentially reiterates the principal guidance provided in the El Malpais legislation: Cultural resources will be managed with an emphasis on future scientific use and, to a lesser extent, future and current public use.

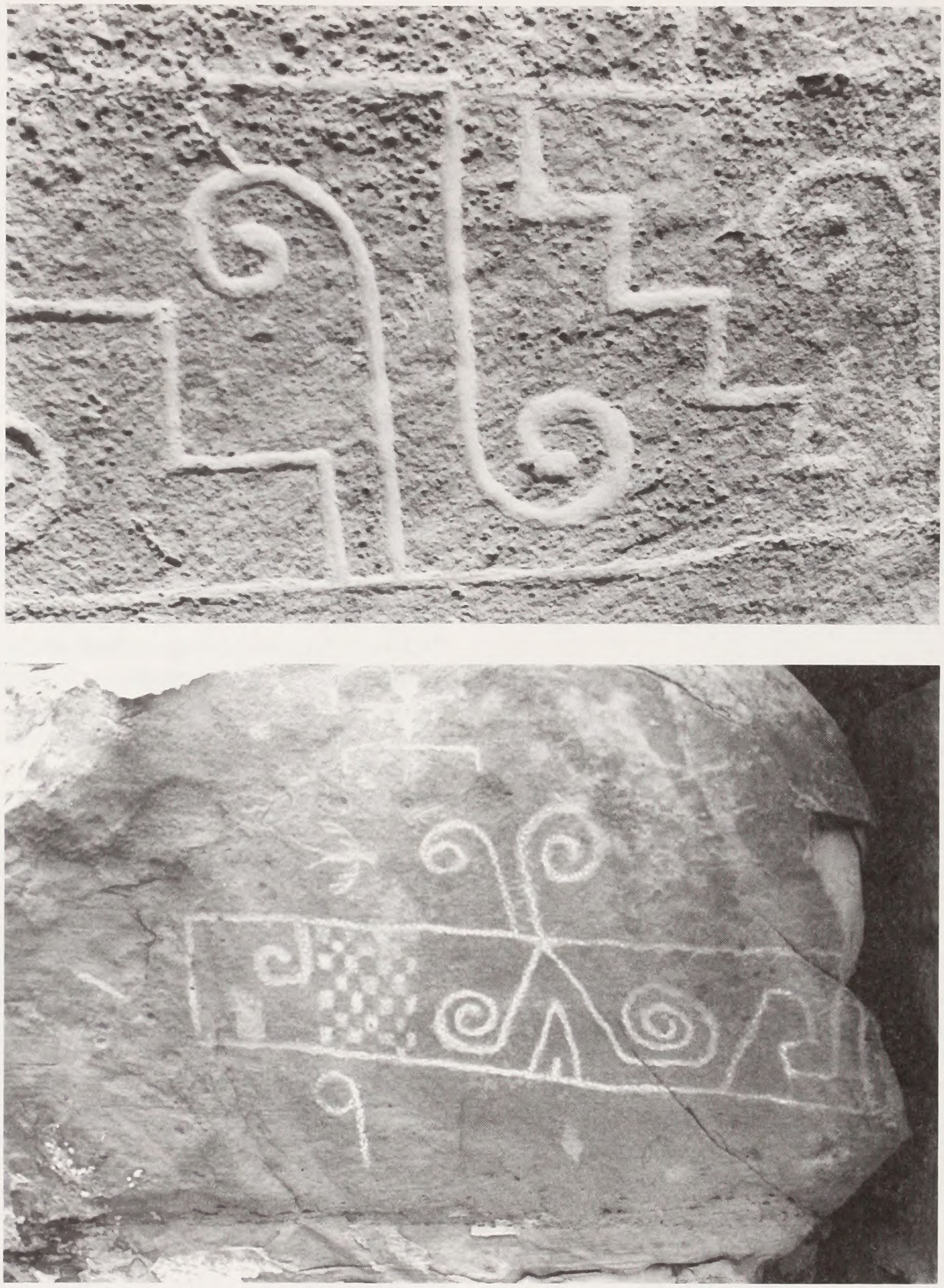


FIGURE 13-2
PETROGLYPHS (LA 10884) IN THE CEBOLLA WILDERNESS UNIT

The second objective is applied to the two wilderness areas in the NCA. This objective is drawn directly from the New Mexico Manual Supplement concerning cultural resource management within designated wilderness areas: Cultural resources will be managed to conserve them in a stable condition for future use for as long as possible.

MANAGEMENT PRESCRIPTIONS AND ACTIONS

Two sets of management prescriptions and actions have been developed, one for the Low Change Alternative and one for the Preferred Alternative.

For cultural resources, the Low Change Alternative minimizes changes in the existing condition of the cultural resources. Therefore, this alternative consists of the strongest, most aggressive management options; it places much more emphasis on resources within the NCA, rather than on equally important resources outside the NCA.

The Preferred Alternative groups those options that strike an appropriate balance between cultural resources management and other land uses. These options also strike a balance between management of cultural resources within the NCA and management of cultural resources in the remainder of the Rio Puerco Resource Area.

The management prescriptions and actions are grouped into four elements. Two of these elements reflect the primary threats to cultural resources in the NCA: vandalism and casual surface collection of artifacts, and natural deterioration. The third element deals with BLM-authorized actions, and the final element considers public information and education about cultural resources.

VANDALISM AND SURFACE COLLECTION

One of the most serious threats to cultural resources in the El Malpais NCA is illegal excavation, a form of vandalism. Many of the Pueblo ruins in the NCA have been damaged by pothunters, who target roomblocks and trash mounds in their search for burials with associated grave goods. This activity damages the scientific value of the sites and can destroy their suitability for public use. In addition, many of these ruins are important to the modern Pueblos because they are recognized as ancestral sites.

For these reasons, pothunting is an especially serious problem in the El Malpais NCA. Increasingly, this activity is carried out by professional criminals who are attracted by the lucrative market for stolen antiquities. Projectile points and other artifacts from the Paleo-Indian Period are prized by collectors and can command high prices in illegal antiquities markets.

In the NCA, two kinds of archeological sites are especially vulnerable to illegal excavations. These are rockshelters, which may contain concentrated cultural deposits and perishable artifacts, and Anasazi sites of the Pueblo II through Pueblo IV periods that have trash mounds or structural remains. These Anasazi sites are most likely to contain the baskets and decorated pottery that attract looters. The general distribution of vulnerable sites parallels that of archeological sites in general (Chapter 1, Map 1-3).

The 1989 El Malpais archeological survey gives representative information about the levels of damage resulting from vandalism. Of the 74 recorded sites that include architecture or trash mounds, 11 (15 percent) have been vandalized. Furthermore, some of the most important sites in the region, such as the Pinole Site, are among the most severely damaged.

Vandalism also includes acts of wanton destruction, such as the burning of historic homesteads, defacement of prehistoric rock art, and the theft of building materials from historic homesteads. These activities are prohibited by laws concerning public property (18 U.S.C. 641) and malicious mischief towards government property (18 U.S.C. 1361).

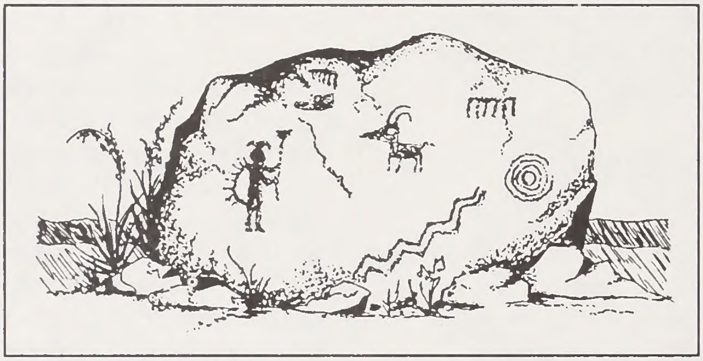
Unauthorized surface collection is another activity that can seriously damage the scientific potential of archeological resources. Often surface artifacts are the only clues that allow assignment of archeological sites to their proper time period. Also, the distribution of artifacts on the surface of an archeological site can sometimes provide valuable information about the kinds of activities that took place there and the distribution of buried materials. Finally, collection of artifacts can affect the public use potential of homesteads, where interesting artifacts such as plowshares and stoves improvised from metal barrels are sometimes found. Unauthorized collection of artifacts is prohibited by both the Antiquities Act and the Archeological Resources Protection Act (ARPA).

Sites that are most vulnerable to damage by surface collection are Paleo-Indian and Archaic sites, where projectile points are often the only means of dating. Projectile points and other artifacts from the Paleo-Indian Period are prized by collectors and can command high prices in illegal antiquities markets. Anasazi sites of the Pueblo III period contain low percentages of distinctive redware ceramics that are essential to accurate temporal placement.

Artifacts from the Archaic Period, such as projectile points and scrapers, usually have little commercial value but are vulnerable to casual surface collection. Loss of these artifacts can have a serious impact on future scientific investigation because surface artifacts are often the only means of confidently dating these sites. Evidence of surface collection is often difficult to recognize. However, the 1989 El Malpais survey recognizes surface collection as an impact that has affected at least 10 (11 percent) of the 87 most vulnerable sites in the NCA. The actual number of sites damaged by this activity is probably much higher.

One key to reducing illegal excavation is vigorous, efficient enforcement of ARPA, which provides stiff penalties for those who engage in this activity. A series of management actions outlined in this plan is intended to facilitate enforcement of ARPA and to make enforcement more efficient. These actions include establishing rewards for information leading to the arrest and conviction of ARPA violators, and ensuring that law enforcement and other key personnel have received ARPA training.

Posting antiquities signs is another measure that can discourage casual excavation and enhance the probability of successful prosecution of looters under ARPA. However, signing can also attract attention to vulnerable archeological sites that may otherwise go unnoticed by potential vandals. Therefore, signing is recommended only in problem areas where illegal excavation is already taking place.



Signing will be implemented in wilderness areas if the existing condition of the cultural resources changes beyond a certain predetermined point (called "the limit of acceptable change"). In all areas, care must be taken to avoid placing signs that would draw unnecessary attention to areas not immediately threatened by vandalism.

Enforcement of ARPA and other federal statutes protecting cultural resources is sometimes hampered by mixed patterns of land ownership. For example, it is sometimes difficult to establish whether or not a vandalized site is on public or private land. Also, access to critical federally protected sites is sometimes across private land.

For these reasons, the Preferred Alternative suggests the acquisition of access easements across key private parcels and the consolidation of federal ownership in areas that include vulnerable sites. These areas include lower Cebolla Canyon, Homestead Canyon, Cerritos de Jaspe, and the Dittert Site.

One measure intended to make illegal excavation, collection, and vandalism more difficult is the closure of certain sensitive areas to vehicular entry except by permit or for management purposes. Such closure would make it more difficult for vandals to reach the sites, while still leaving the areas available for motorized law enforcement patrol and monitoring. This type of closure is proposed for the Spur subunit and the Citadel Site, and would be triggered in other areas by vandalism that exceeds the limits of acceptable change in cultural resources.

Another BLM action that could help discourage vandalism and illegal surface collection is increasing BLM visibility, especially during times of increased visitor use such as hunting seasons and in sensitive areas such as the NM 117 corridor. Implementation of this action implies increased staffing and use of work schedules that ensure rangers and other personnel are in the field during times of maximum public visitation.

Another key management prescription related to this element is identification of vulnerable sites and areas of active vandalism. To implement this action, further sample survey is needed. Because present levels of inventory are so low, the BLM cannot confidently identify problem areas. To correct this situation, this plan calls for increasing the level of inventory to 5 percent in all units of the NCA. This goal is modest, but achievable during the life of this plan. The sample survey will help identify problems of natural deterioration and allow the BLM to meet other legal mandates such as the Historic Preservation Act and Executive Order 11593 as well.

In addition to further sample survey, the plan calls for two more specialized survey techniques. The first is Class III inventory in selected areas of known high sensitivity. The other is a reconnaissance survey to identify and record homesteads and rock art sites.

As vulnerable sites are identified, their condition should be monitored to allow problem areas to be actually taking place. When evidence of recent vandalism is found, formal assessments of damage should be completed, so the levels of damage being sustained in the area can be documented and appropriate actions triggered.

Monitoring may be done by a cultural resources specialist, but once baseline information has been collected other employees or volunteers can perform this function with minimal training. This information must be gathered systematically. For major sites such as the Dittert Site, the Pinole Site, the Citadel Site, rock art sites, and the Oak Tree Site, a program of annual photomonitoring should be established. For other sites, a program that schedules visits to a number of different sites each year should be conducted. This program should focus on collecting standard information about trend in condition.

For areas that receive heavy public visitation, index sites should be thoroughly documented immediately. Such documentation might include characterization of the number, types, sizes, and distribution of surface artifacts present at this time. In subsequent years, collection of the same information from these sites can be used to gauge the levels of damage these areas are sustaining.

NATURAL DETERIORATION

In addition to human factors, a number of natural processes result in the deterioration of cultural resources, with corresponding loss of their scientific potential and value for public use. One of the most serious is soil erosion. This problem is most acute on the east side of the NCA, where steep slopes and erodible soils predominate and archeological sites are most numerous.

The 1989 El Malpais survey recognizes some degree of erosion on 97 of the 103 sites recorded. Of these, erosion is particularly severe on 14 (13 percent). Two erosion control devices are in place specifically to protect cultural resources, both at the Arroyo Site.

Loss of standing masonry walls in both archeological and historical sites is another problem within the NCA. As a result of freeze-thaw cycles, erosion of mortar, undermining of walls, and other processes, these walls may be lost. Finally, several wooden structures dating from the homesteading era are endangered by weathering, insects, fire, and other factors.

Under the Preferred Alternative, the BLM would continue Class II and Class III inventory to identify archeological properties vulnerable to natural deterioration. Reconnaissance surveys would also be used to locate homesteads with standing architecture that are in need of attention.

At the Dittert Site, the Oak Tree Site, and the Arroyo Site, existing stabilization and erosion control projects would be maintained. New stabilization and/or erosion control projects would be undertaken if high resource values were endangered, even within wilderness.

During and after a thorough inventory, stabilization and repair needs would be assessed for historic homesteads. Key sites, including all those being managed for public interpretation, would be monitored annually to ensure timely identification of natural deterioration. Inspection of other sites would parallel the monitoring program discussed under the preceding element.

Although erosion is one of the most serious processes destroying cultural resources in the NCA, the underlying causes of the erosion are not well understood or documented. As a result, erosion control measures to date have tended to treat specific problems without addressing the overall issue. To correct this, this plan calls for a well-researched assessment of erosion in areas of the highest cultural resource densities, with recommendations for halting the current erosional cycle.

Under the Preferred Alternative, high-value homestead locations that include flammable elements would be singled out and staked as high-priority fire suppression zones. This measure would apply in wilderness as well as non-wilderness areas.

Preservation of historic homesteads requires specialized techniques of stabilization and repair to be effective and non-intrusive. Therefore, specialized training is needed before a program to preserve these sites is developed and implemented.

BLM-AUTHORIZED ACTIONS

Many actions the BLM may undertake or authorize could affect cultural resources within the NCA. Such actions include recreation developments, range improvements, and authorization of archeological research, for example. The El Malpais legislation requires special attention to the Historic Preservation Act in these cases. Through its emphasis on the preservation of cultural resources, the El Malpais legislation also implies that the BLM should be especially cautious when contemplating impacts to cultural resources in the NCA.

Because the legislation emphasizes preserving cultural resources for long-term scientific use, restrictions will be placed on archeological research that could result in physical alteration of Paleo-Indian, Archaic, or Anasazi remains, including surface collection. It is assumed that cultural resources within the NCA are generally less threatened than resources outside the NCA. Therefore, uses that result in the physical alteration of cultural properties should be encouraged to focus outside the NCA whenever possible. Within the NCA, research that uses existing collections or non-disturbing field techniques will be encouraged whenever possible.

Whenever research involving the physical alteration of Paleo-Indian, Archaic, or Anasazi sites is proposed within the NCA, a research design must be prepared that details the nature of the proposed work, its purpose, and its anticipated impact upon the universe of similar properties within the NCA. Researchers must consider the feasibility of conducting their research using cultural resources outside the NCA. They must justify physical alteration of the NCA's cultural properties in terms of clearly existing threats to their physical integrity or in terms of the central role these particular sites play in relation to the research design.

Such research will be approved only under the following circumstances: (1) the characteristics to be altered are threatened and would be lost in the absence of data recovery; or (2) the research cannot be done using sites outside the NCA, and after the research is complete a substantial portion of the site or equivalent sites will remain in an unaltered state. These provisions will be applied even more stringently in the wilderness units. The use of existing collections and non-disturbing field techniques for research will be encouraged whenever possible.

Occasionally development projects such as range improvements or recreation facilities will be proposed within the NCA. Management prescriptions and actions under the Preferred Alternative emphasize avoidance of cultural resources in these situations, rather than mitigation through data recovery. Secondary impacts, such as those resulting from recreation use, must be more thoroughly studied and evaluated than is usual outside the NCA. Therefore, this plan requires inventory of at least 1/4-mile radius around proposed visitor use developments.

To minimize the need for additional collection of cultural materials from the NCA, existing collections of artifacts and records should be traced and inventoried. For certain projects such as the Arroyo Site excavations, final written reports must be prepared and arrangements made for permanent curation.

Inclusion of cultural resources in the NCA affords these sites a degree of protection not enjoyed by other sites in the Rio Puerco Resource Area. Because of this, the BLM will continue to nominate eligible properties to the National Register of Historic Places, but will put no special priority on nominating sites within the NCA. Sites of equal importance outside the NCA would probably benefit more from National Register listing than sites within the NCA. Key NCA sites that should be nominated include the Cebolla Canyon Complex, the Citadel Site, and the Pinole Site. Also, the area of the Dittert Site covered by National Register listing should be enlarged to include more of the ruins that comprised this prehistoric community.

A final action considered under this element is the addition of the 13,000-acre Tank Canyon area to the Conservation Unit. This is a large contiguous block of public land that adjoins the NCA on the south. The dense archeological zone found along the NM 117 corridor is known to extend south into this area. One major late pueblo, the Newton Site, is on public land in this area. These lands and their cultural resources should logically be managed as part of the NCA; their acquisition is recommended as part of the Preferred Alternative (refer to Chapter 2).

PUBLIC INFORMATION AND EDUCATION

The El Malpais legislation emphasizes public information and education as an important aspect of managing the NCA. Public education can be an important tool in reducing vandalism and promoting public enjoyment and appreciation of cultural resources. For these reasons, several management prescriptions and actions in this plan deal with public information and education.

In addition to off-site interpretive measures such as brochures, exhibits, and other media, the Preferred

Alternative would also encourage visitation at the Dittert Site and at a prehistoric reservoir near the proposed BLM Ranger Station. The BLM would cooperate with Acoma Pueblo in developing Calabash Ruin if the pueblo requests. Public interpretation would also be developed for outstanding homestead sites.

Several other sites allocated for public use would not be developed during the life of this plan, but would be managed to protect their potential for public use. These sites are the Pinole Site, the Citadel Site complex, and two rock art sites (LA 10884 and LA 11710). One very large, partially vandalized prehistoric ruin on private land near the proposed BLM Ranger Station lies outside the NCA. If it were added to the NCA as recommended under the Preferred Alternative, it could be incorporated into an active program of public information and education based at the Ranger Station.

TABLE 13-4
MANAGEMENT PRESCRIPTIONS AND ACTIONS FOR CULTURAL RESOURCES

Management Prescriptions and Actions	NCA Unit	Affected Environment Natural (BLUs)	Human
Vandalism & Surface Collection			
Enhance probability of catching & successfully prosecuting violators			
Establish & publicize rewards for information leading to arrest & conviction of ARPA violators	All	All	Increasingly, ARPA violators are professional criminals who loot sites for profit
Ensure ARPA training for law enforcement & other key field personnel		All	ARPA enforcement requires specialized training
Post antiquities signs in areas of active vandalism (e.g., Cebolla Canyon Complex)	CU CWA	ABI	Place signs so as not to attract vandals to undisturbed sites
Discourage vandalism & illegal surface collection	All	ABI	
Consolidate ownership of critical properties (e.g., Pinole Site, Cebolla Canyon Complex) to clarify land ownership			Looters claim their activities are on private land
Restrict vehicle access to areas with sensitive sites & high site densities (e.g., Cebolla Canyon Complex, Spur)			Reduce illegal collection, force looters to leave vehicles exposed
Increase BLM visibility in NCA, especially during increased visitor use & in sensitive areas (e.g., NM 117 Corridor)			General correlation assumed between visitor use & casual excavation/surface collection
Identify sites & areas vulnerable to & affected by vandalism & surface collection	All	All	Need to understand activity patterns of vandals
Increase level of Class II inventory to 5% of unit (5,759 acres of new Class III survey)			
Complete Class III inventory of Cebolla Canyon Complex (160 acres + additional acreage in Cebolla Wilderness Unit), Spur area (360 acres), & other key areas identified through Class II inventory			

TABLE 13-4 -- CONTINUED

		Affected Environment	
Management Prescriptions and Actions	NCA Unit	Natural (BLUs)	Human
Through aerial photointerpretation, review of existing records, & reconnaissance, record & photodocument all homesteads & rock art sites in NCA		ABI	
Monitor sites & areas most vulnerable to vandalism & surface collection, to recognize & stop problems early	CU CWA	ABCI	Need to understand activity patterns of vandals
Establish annual photomonitoring for Oak Tree Site & other key vulnerable sites			Federal access into important areas could be blocked
Establish & implement program to systematically monitor recorded sites, gather information about changes in condition			
Acquire easements into lower Cebolla Canyon & Cerritos de Jaspe to ensure legal access for monitoring & law enforcement			
Prepare damage assessments for incidents of recent vandalism		ABC	Quantify damage done by vandals
Monitor sites & areas most vulnerable to vandalism & surface collection, to recognize & stop problems early	CU CWA	ABI	
Initiate long-term study using detailed surface documentation to record effects of surface collection (perhaps with sites near Ranger Station & Arch, & at Dittert Site)			Nature, degree, rate of deterioration caused by casual artifact collection not well understood
Natural Deterioration			
Identify sites & areas vulnerable to & affected by natural deterioration	CU CWA		
Increase level of Class II inventory to 5% of unit (5,759 acres of new Class III survey), emphasizing information about site condition		All	Important scientific & perhaps interpretive values being lost without BLM knowledge
hrough aerial photointerpretation, review of existing records, oral history, & reconnaissance, record & photodocument all homesteads & rock art sites within units		ABCI	Potential interpretive properties need identification & condition evaluation
Monitor sites & areas most vulnerable to & affected by natural deterioration to recognize & stop or mitigate problems early	CU CWA WMWA		
Establish annual photomonitoring for Oak Tree Site, Pinole Site, Arroyo Ruin, Site 407, well-preserved homesteads, & other vulnerable sites		ABI	Scientific or interpretive sites being lost through natural erosion need monitoring, condition updates, & prioritization of actions

TABLE 13-4 -- CONTINUED

Management Prescriptions and Actions	NCA Unit	Affected Environment	
		Natural (BLUs)	Human
TEstablish & implement program to systematically monitor recorded sites threatened by natural deterioration		ABCI	
Preserve scientific values & sites with public interpretation potential through physical protection measures			
Maintain existing stabilization & erosion control projects at Arroyo Ruin & Oak Tree Site	CWA	AB	Values could be lost through site neglect
Develop erosion control plans to emphasize cultural resources for Spur, Breaks, Brazo subunits	CU	ABI	Values being lost through erosion
Stabilize, backfill & repair Pinole Site, Citadel Complex, & historic homesteads	CU CWA	ABCI	Interpretive values lost if measures not taken
Develop staff expertise in repair & preservation of historic homesteads & related features through training or detail assignments	CU	ABCI	Special knowledge & skills required
Establish & stake high-priority fire suppression zones to protect high-value homesteads that include flammable elements	CU	ABCI	Properties with public interpretation potential could be lost
Public Information & Education			
Maintain continuing program of interpretation & public education about cultural resources in NCA	All		
Present cultural resources in exhibits in Multi-agency Center & BLM Ranger Station		B	Human behavior can be influenced by information & education
Incorporate cultural resources information into environmental education programs given at schools	CU		
Prepare site bulletins (brochures) about cultural resources of NCA			
Identify cultural resources with public interpretation potential (e.g., Cebolla Canyon Complex, suitable homesteads) & manage them to maintain potential		ABI	
Develop on-site interpretation at Ranger Station prehistoric reservoir			
Modify unit boundary to include large pueblo near Ranger Station & develop onsite interpretation for property			
BLM Authorized Actions			
Preserve long-term potential of sites for scientific use	All		
Restrict research involving collection or excavation at non-threatened sites		ABI	Research can destroy or diminish scientific potential

TABLE 13-4 -- CONTINUED

		Affected Environment	
Management Prescriptions and Actions	NCA Unit	Natural (BLUs)	Human
Avoid rather than mitigate cultural resources during development		All	
Inventory at least 1/4-mile radius around proposed visitor-use developments, & consider potential secondary impacts		ABI	Cumulative impacts of casual collection by visitors can severely damage cultural resources
Preserve long-term potential of sites for scientific use			
Expand base of archeological properties in NCA by adding 13,000-acre Tank Canyon area			Comparable resources outside NCA on adjoining public land
Reduce need for research involving collection or excavation by encouraging use of existing collections	CU CWA		
Write up excavations from Arroyo Site & arrange for permanent curation of artifacts		ABI	
Locate existing collections from previous research & compile copies of project records		ABI	
Emphasize importance of key cultural resources	CU CWA	ABI	
Nominate Cebolla Canyon Complex, Pinole Site, & selected homestead sites to National Register of Historic Places			National Register listing will enhance public perceptions of properties' importance

APPENDICES

APPENDIX A

APPENDIX A
HIGHLIGHTS OF THE EL MALPAIS LEGISLATION (PL 100-225)

Title I - National Monument

Establishment of Monument

Section 101	Designates a 114,000-acre National Monument to protect highly significant natural and cultural resources.

Transfer

Section 102	Transfers management of certain lands from the Cibola National Forest to the Secretary of Interior to be managed as part of the National Monument.

Management

Section 103	National Monument will be managed according to laws that apply to units of the National Park System. Management purposes of the monument are to preserve scenery and natural, historic, and cultural resources and to provide public understanding and enjoyment of these resources.

Permits

Section 104	Grazing privileges within the monument will end on January 1, 1998.

Title II - Masau Trail

Designation of Trail

Section 201	Authorizes the National Park Service to designate a vehicular tour route linking prehistoric and historic cultural sites in New Mexico and eastern Arizona.

Areas Included

Section 202	Initially the trail will link El Malpais National Monument, El Morro National Monument, Chaco Cultural National Historical Park, Aztec Ruins National Monument, Canyon de Chelly National Monument, Pecos National Monument, and Gila Cliff Dwellings National Monument. Additional trail segments linking other cultural sites or sites of national significance may be designated later by the Secretary.

Information and Interpretation

Section 203	The Secretary may enter into cooperative agreements to help interpret natural and cultural resources of such sites. The Secretary, in cooperation with other public, Indian, and non-profit entities, must prepare and distribute information about sites along the trail.

Markers

Section 204	The trail will be marked with appropriate markers. Signs and other informational devices may be accepted as donations.
(Senate Report)	The National Park Service should work closely with the State of New Mexico in establishing the trail markers, sharing the costs. If petroglyphs on the Albuquerque West Mesa are added to the National Park System, they should be incorporated into the Masau Trail.

Title III - El Malpais National Conservation Area

Establishment of Area

Section 301	Establishes a 262,690-acre National Conservation Area to be managed by the Bureau of Land Management to protect natural, cultural, scenic, and wilderness resources of national importance.
(Senate Report)	The BLM is expected to erect a ranger station along NM State Road 117.

Management

Section 302(a)	The National Conservation Area shall be managed according to applicable laws.
(Senate Report)	Resource management plans referred to in this act are those required by the Federal Land Policy and Management Act (FLPMA).
Section 302(b)	Hunting and trapping are to be permitted in the conservation area, subject to limitations that may be imposed after consultation with the State of New Mexico.
Section 302(c)	Commercial wood collection is prohibited.
Section 302(d)	Livestock grazing will continue within the conservation area.

Title IV - Wilderness

Designation of Wilderness

Section 401	Designates the Cebolla Wilderness (60,000 acres) and the West Malpais Wilderness (38,210 acres).

Management

Section 402	Wilderness areas are to be managed in accordance with the Wilderness Act of 1964, and grazing is to continue within the wilderness areas.

Title V - General Provisions

Management Plans

Section 501(a)	Separate general management plans will be prepared for the monument and conservation area within 3 years. Each must include an interpretation and public education plan, a public facilities plan (providing for both a visitor center and a multiagency orientation center), a natural and cultural resource plan, and a wildlife management plan.
(Senate Report)	Cultural resource plans will include wilderness areas. Appropriate forms of archeological research, including identification, excavation, stabilization, conservation, and protection of cultural resource sites will be permitted. Short-term disturbances resulting from these activities will be rehabilitated. Long-term scientific use of archeological values will conform to the concept that wilderness areas are devoted to public purposes of recreational, scenic, scientific, educational, conservational, and historic use.
(House Report)	Wilderness areas are to be included in the cultural resources plans, which will provide for active identification and management of historic properties, including protection of archeological values from looting, vandalism, and artifact collection. Appropriate forms of research and related activities should be permitted in the wilderness areas, including investigation, identification, stabilization, conservation, and protection of cultural resource sites from deterioration by natural forces and from vandalism. Research should be conducted so as to minimize impacts, and short-term disturbances resulting from such activities must

	be rehabilitated. The BLM should consult with the Advisory Council on Historic Preservation and the State Historic Preservation Officer to establish guidelines for identification, management, and research of historic properties within wilderness. This guidance is consistent with the Wilderness Act. The need to prevent looting and vandalism is stressed, and public support for protection, recognition, and interpretation is noted.
Section 501(b)	A 17,500-acre Wilderness Study Area is established. Wilderness potential of this area will be protected until completion of the General Management Plan, which shall include a review of the wilderness suitability of these lands and a recommendation on this subject.
Section 501(c)	All roadless areas within the National Monument (except potential development areas) will be reviewed for wilderness suitability and a recommendation made on this subject in the General Management Plan. Pending submission of the recommendation, managers will protect wilderness potential of the areas.
(Senate Report)	Protection of wilderness values does not preclude improving access and providing interpretive and recreational facilities in areas currently penetrated by roads.
(Senate and House Reports)	The National Park Service should use the Bureau of Land Management wilderness inventory policy definition of "road" in determining which lands are "roadless." "Potential development areas" may be included in the wilderness suitability study at the discretion of the agency.
(Senate Report)	The Department of the Interior is urged to enter into a cooperative agreement with the Department of Defense to locate and clear military ordnance in the monument and conservation area.
(House Report)	The Secretary of the Interior is expected to consult with the Secretary of Defense concerning the nature and extent of unexploded ordnance in the monument and conservation area, and the cost and feasibility of removing these materials or protecting the public from them.

Acquisitions

Section 502	The Secretary of the Interior is authorized to acquire lands and interests within the monument and conservation area. Lands owned by the State of New Mexico may be acquired only by exchange. Congress expects acquisition of subsurface interests to be completed within 3 years.
(Senate and House Reports)	Authority to acquire lands and minerals may extend beyond 3 years. Indian trust lands may not be condemned, and Indian lands should only be acquired with the consent of the Indian owners.

State Exchanges

Section 503(a)	Upon request by the State of New Mexico, the Secretary is required to exchange state land within the monument or conservation area for equal value parcels elsewhere in the state.
Section 503(b)	Within 6 months, the Secretary will identify for the State Land Commissioner those state lands within the monument and conservation area and those federal lands that are available for transfer to the State of New Mexico in exchange. Such listing is to be updated annually. Congress expects the land exchanges to be completed within 2 years.
(Senate and House Reports)	Authority for state exchange may extend beyond 2 years.

Mineral Exchanges

Section 504	The Secretary is directed to exchange approximately 15,000 acres of federal mineral rights identified in the act for approximately 15,000 acres of mineral rights owned by Santa Fe Pacific Industries within the conservation area. Such exchange is to be on the basis of equal value, the exchange must be consistent with FLPMA, and the Secretary must deter

	mine that the exchange is in the public interest. The exchange is to be completed within 3 years.
(Senate and House Reports)	Authority for the exchange may extend beyond 3 years.
(House Report)	The Committee believes that this exchange is in the public interest and intends these provisions to facilitate the exchange, consistent with FLPMA.

Acoma Pueblo Exchanges

Section 505 (Senate and House Reports)	Congress intends that the National Park Service and Bureau of Land Management be sensitive to needs of Native American groups. Boundaries of the National Monument and Cebolla Wilderness were drawn specifically to allow continued road access to Acoma deeded land. Acoma grazing may continue for 10 years within the monument and indefinitely within the conservation area.
Section 505(a)	The Secretary is authorized, at the request of Acoma Pueblo, to exchange certain lands within the conservation area or other lands of equal value outside the conservation area for Acoma trust lands west of NM State Road 117. Lands exchanged to the Acoma shall be held in trust while the acquired lands will be incorporated into the monument.
Section 505(b)	Consistent with law and existing land use plans, Bureau of Land Management lands within New Mexico shall be available for exchange.
Section 505(c)	Certain identified lands within the conservation area are available for exchange, provided Acoma Pueblo requests exchange within 1 year. Otherwise these public lands are incorporated into the conservation area and certain areas would be included in the Cebolla Wilderness.
(Senate Report)	The National Park Service and Bureau of Land Management should pursue exchanges prior to purchase of lands. All lands within the conservation area need not be consolidated into federal ownership. Power of condemnation will be used to acquire lands in the conservation area only where there is an imminent threat to the purposes for which the conservation area was established. Both agencies should work cooperatively with private land owners and range users to minimize construction of permanent fences and to maintain existing access to private property, where possible.
(House Report)	The 1-year deadline for Acoma exchange involving conservation area lands is intended to minimize potential interference with proper management of the conservation area and wilderness. Additional proposals for transfer of lands in these areas to the Pueblo of Acoma are not considered necessary or desirable.

Exchanges and Acquisitions Generally; Withdrawal

Section 506(a)	Generally, exchanges should be on the basis of equal value. However, the Secretary may make exceptions if they are in the public interest.
Section 506(b)	"Public Lands" has the same meaning as in FLPMA.
Section 506(c)	Lands or interests acquired within the monument or conservation area after enactment of this legislation shall be incorporated into the monument or conservation area.
Section 506(d)	No federal lands within the monument or conservation area shall be transferred out of federal ownership or placed in trust, except as provided for in this act. Subject to valid existing rights, federal lands within the monument and conservation area are withdrawn from all forms of entry, appropriation, or disposal and from location, entry, and patent under the mining laws. They are closed to mineral leasing and geothermal leasing.
Section 506(e)	Acreages in the act are approximate; referenced maps take precedence over acreage figures.

Section 506(f)	The Secretary is authorized to accept land contiguous to Pecos National Monument by donation.
Section 506(g)	Capulin Mountain National Monument is redesignated Capulin Volcano National Monument, and other administrative details of records and boundaries of this monument are enacted.

Access

Section 507(a)	The Secretary is required to permit access for continued traditional cultural and religious use of the monument and conservation area by Native Americans.
Section 507(b)	The Secretary shall request the recommendations of Acoma Pueblo and other Indian tribes about methods of assuring access, enhancing the privacy of traditional cultural and religious activities, and protecting traditional cultural and religious sites.
Section 507(c)	The Secretary may temporarily close to public use specific, limited portions of the conservation area and monument to protect the privacy of the religious activities of Indian people. Written notification of such action must be provided to the Energy and Natural Resources Committee of the Senate, and to the Interior and Insular Affairs Committee of the House, within 7 days after initiation of any such closure.
Section 507(d)	An advisory committee including representatives of Acoma, Zuni, other appropriate Indian tribes and other persons or groups may be established to advise the Secretary on these matters.
(Senate and House Reports)	The Secretary must consult appropriate Indian tribes and their traditional cultural and religious authorities during preparation of the general management plans to determine what the traditional cultural and religious uses have been.

Cooperation

Section 508	The Secretary is authorized and encouraged to cooperate with other agencies and groups to further the interpretation of prehistoric civilizations of New Mexico and eastern Arizona. Specifically, the Secretary is encouraged to cooperate in development of a multi-agency orientation center near Grants, New Mexico.

Water Rights

Section 509	Water rights for the minimum amount of water needed to carry out the purposes for which the monument, conservation area, and wilderness areas were established are reserved. This clause shall not affect any existing water right or pending application, and this subsection does not require the National Park Service to drill wells. Nothing in this section establishes a precedent with regard to future designations, nor does it affect interpretation of any other act or designation.
(Senate Report)	The Committee reiterates that reservation of water applies only to this act and should have no bearing on interpretation of any other reserved rights doctrine. The water rights reservation is junior to those of all existing wells and pending applications. No conflict is anticipated between the federal government's need for water and any valid existing or pending rights.

Authorization

Section 510	This section authorizes $16.5 million for purposes of the act: $10 million for land acquisition in the monument, $1 million for development in the monument, $4 million for land acquisition with the Conservation Area, $1 million for development within the conservation area, and $500,000 for planning and developing the Masau Trail.

APPENDIX B

APPENDIX B

SUMMARY OF LAND PROTECTION PLAN

INTRODUCTION

The BLM has prepared a Land Protection Plan for the El Malpais National Conservation Area (NCA) to provide strategies and priorities for (1) the protection and preservation of resources and (2) visitor use on lands in non-federal ownership. This appendix summarizes the BLM's Final Land Protection Plan, which was released to the public in September, 1989. The Final Land Protection Plan is incorporated by reference into this GMP.

The BLM usually prepares a different kind of plan to accomplish these goals. However, in this case the agency recognizes the close interrelationships between the National Conservation Area and the National Monument. Therefore, the BLM has prepared a Land Protection Plan for the NCA in the same format as the Land Protection Plan prepared by the National Park Service for the El Malpais National Monument.

The Land Protection Plan was prepared to determine what land or interests in land inside the boundary of the NCA need to be in public ownership, as well as what means of protection other than acquisition are available to achieve NCA purposes as established by Congress. The plan will be used to find opportunities to protect the NCA through cooperation with state and local governments, landowners, and the private sector. It will assist the BLM in identifying priorities for making budget requests and allocating available funds to protect public and private resources for which the NCA was designated.

The Land Protection Plan also informs landowners about the BLM's intentions to acquire land or protect it through other means. Priorities for land protection are identified, and requests for land protection funds will be based on these priorities.

It must be emphasized that the Land Protection Plan is not an offer to purchase land or interests in land. Rather, it serves to guide future protection efforts, subject to the availability of funds and other constraints. The plan in no way diminishes the rights of non-federal landowners.

The public has been encouraged to comment on the Land Protection Plan and to aid in its formulation. The plan will be revised as necessary to reflect changing conditions.

ISSUES SUMMARY

Following is a summary of the issues regarding private land within the NCA that are addressed in the Land Protection Plan.

1. About 96,800 acres of privately owned mineral estate underlying federally owned surface are spread in a checkerboard pattern over much of the NCA (refer to Map B-1).

2. Some lands within or controlling access to the Cebolla Wilderness and the West Malpais Wilderness are privately owned (refer to Map B-2).

3. Cebolla Spring and the related marsh area are key components of the Cebolla Canyon riparian habitat and are privately owned.

4. Control of the scenic quality along New Mexico Highway (NM) 117, Interstate (I-) 40, New Mexico Highway (NM) 53, and County Road (CR) 42, in that order, is important to maintaining the integrity of the NCA.

5. Lands containing some prime natural and/or cultural resources, such as scattered parcels of land in the Brazo, Cerritos de Jaspe, and Breaks subunits are privately owned.

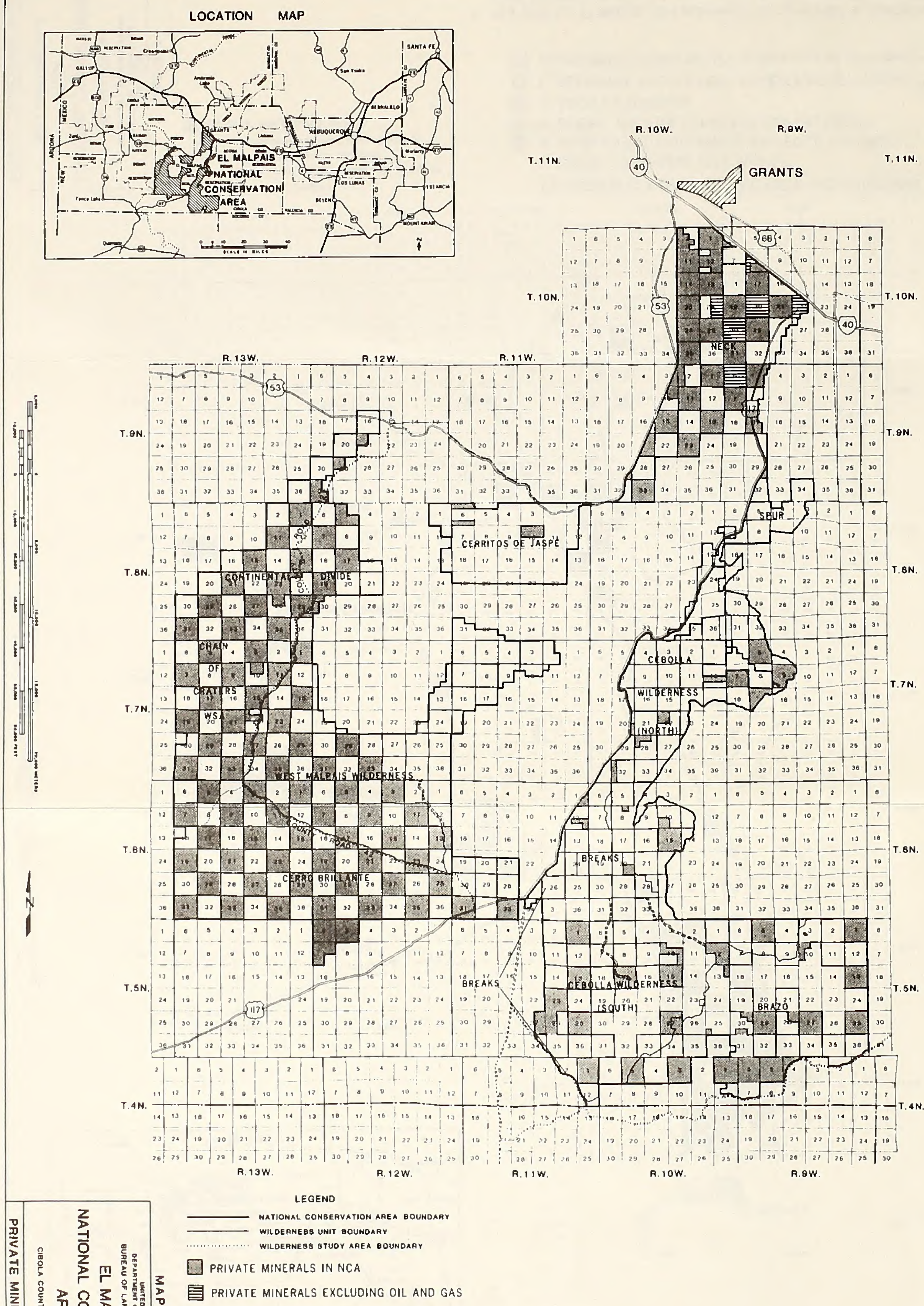
6. Approximately 800 acres of Acoma Tribal Trust Lands have been included within the boundaries of the NCA. Protecting Acoma concerns and the intent of NCA designation is important.

7. An industrial park is being planned for private land that lies mostly within the NCA, to the northwest of the proposed Multiagency Center.

8. Some lands within the NCA that provide access and/or protection to resources in the El Malpais National Monument are privately owned (refer to Map B-2).

PLAN SUMMARY

Current Ownership (NCA)	Surface	Minerals
Federal	213,600	165,800
Private	48,200	96,800
Acoma	800	
TOTAL ACREAGE	262,600	262,600
Method of Protection Proposed*		
Exchange or Fee Acquisition	14,500	96,800
Scenic and Conservation Easements	9,100	
Statutory Acreage Ceiling	None	
Funding Status		
Authorized Acquisition Ceiling		$ 4,000,000
Appropriated to date		$ 1,000,000
Proposed for FY 1990		$ 1,250,000



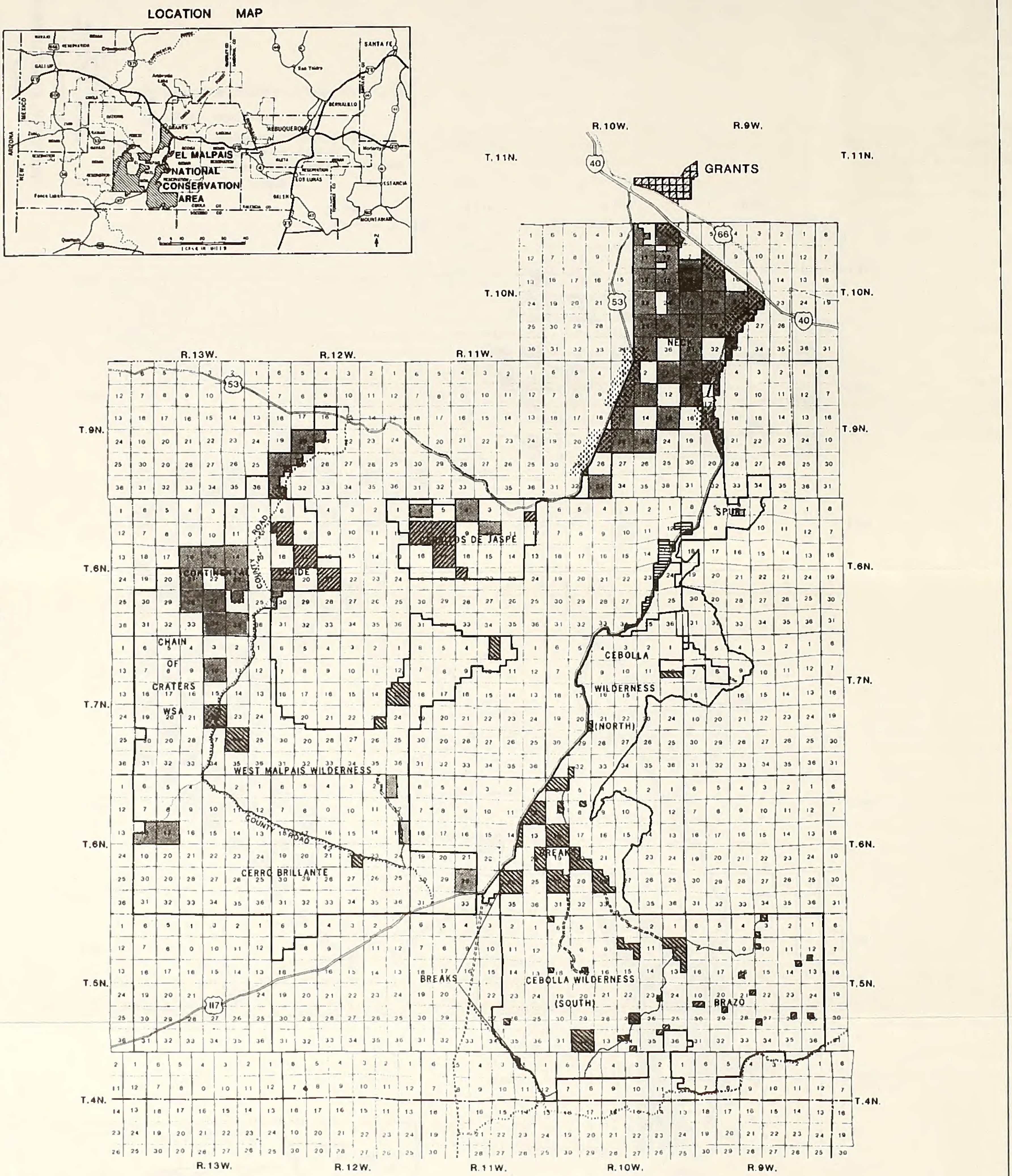
MAP B-2

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

EL MALPAIS
NATIONAL CONSERVATION
AREA

CIBOLA COUNTY, NEW MEXICO

PRIVATE MINERALS IN NCA



LEGEND

——— NATIONAL CONSERVATION AREA BOUNDARY

——— WILDERNESS UNIT BOUNDARY

·············· WILDERNESS STUDY AREA BOUNDARY

▩ PRIVATE INHOLOINGS IN NCA

PRIORITIES FOR PROTECTION/ACQUISITION

1. PRIVATE MINERALS (See Map 3)

▧ 2. WILDERNESS INHOLDINGS AND EDGE HOLDINGS

░ 3. SCENIC AND/OR CONSERVATION EASEMENTS

▤ 4. ACOMA EXCHANGE

▨ 5. RESOURCE PROTECTION/FACILITY DEVELOPMENT *

☒ 6. NPS PROTECTION NEEDS (Others may be identified in the NPS GMP)

* The GMP for El Malpais NCA scheduled for completion in September, 1990 may make recommendations of other private lands requiring some form of protection.

MAP B-1

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

EL MALPAIS
NATIONAL CONSERVATION
AREA

CIBOLA COUNTY, NEW MEXICO

PRIVATE INHOLDINGS IN NCA

Note: *The Land Protection Plan summarized here contains complete recommendations for only the first four protection priorities (see below). The General Management Plan contains recommendations for other private lands that require some form of protection.

LAND PROTECTION RECOMMENDATIONS

The recommendations in the Land Protection Plan are based on the legislative intent and direction established by the El Malpais legislation (PL 100-225). This law requires the BLM to protect important natural, cultural, and scenic values within the designated boundaries of the NCA, but does not direct the agency to consolidate all land within the NCA into federal ownership.

Congress intended that when the BLM seeks to acquire private land within the NCA, the consent of the property owner should be obtained. This consent requirement applies unless an imminent threat exists that the land is to be developed in a manner detrimental to the purposes for which the NCA was established.

A combination of land protection methods should be used to protect NCA resources on private lands. As authorized by Sections 502 through 506 of the El Malpais legislation, the BLM can acquire lands or interests in lands (i.e., mineral estate and conservation or scenic easements) by the following methods: (1) donation, (2) purchase with donated or appropriated funds, (3) exchange, and (4) transfer from any other federal agency. Cooperative agreements can also be utilized to protect privately owned resources.

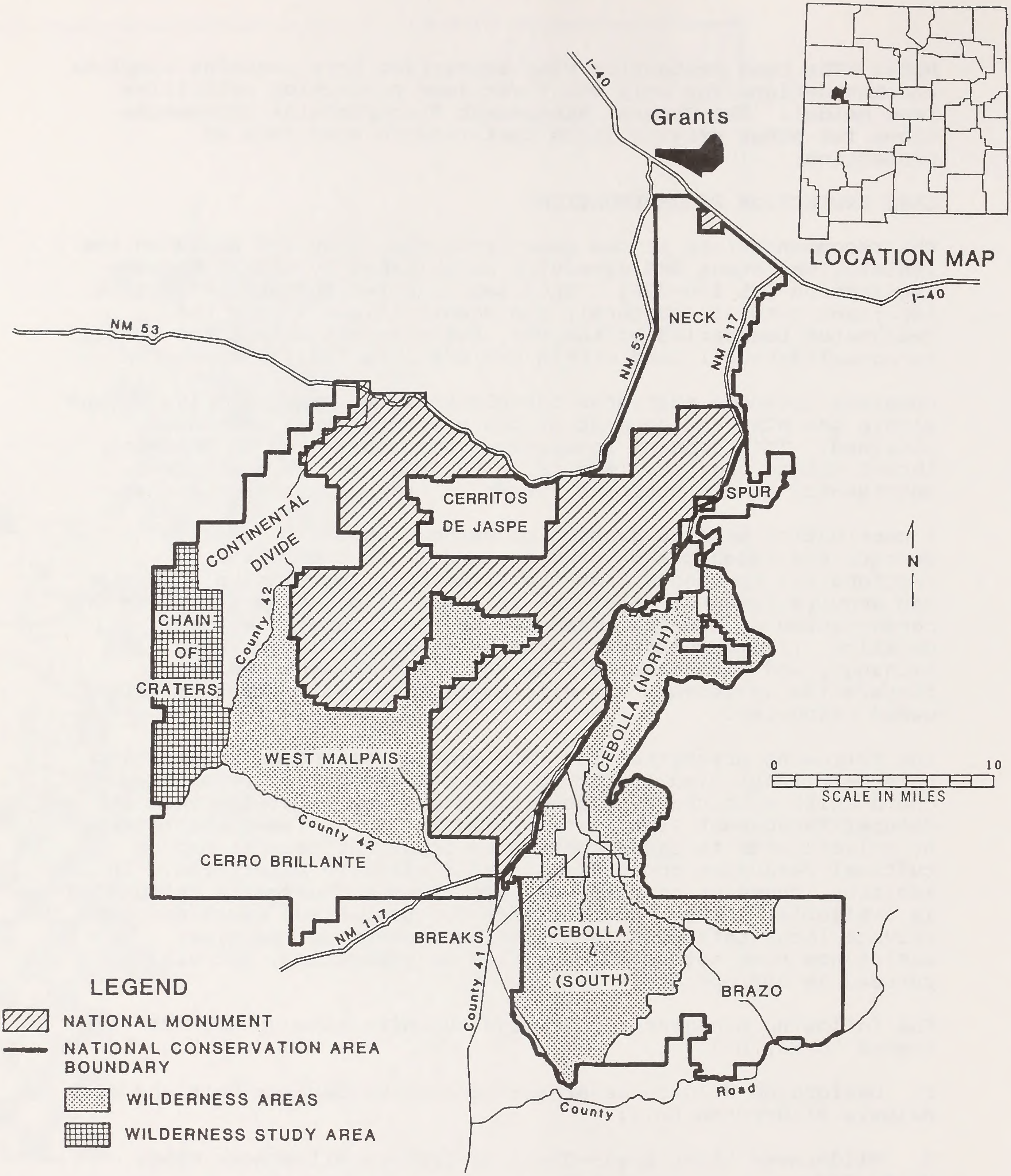
The following priorities for land protection and/or acquisition have been identified (refer to Maps B-1 and B-2). Priorities could shift with changing conditions and new knowledge when the General Management Plan is completed in 1990. Immediate threats by private uses to lands containing important natural and/or cultural resources could also cause a shift in priorities. In addition, these priorities may be pursued concurrently as funding is available. Other opportunities for protecting resources on private lands through cooperative agreements or technical assistance have not been identified as priorities, but will be pursued as appropriate.

The following management units and subunits make up the NCA (refer to Map B-3):

1. Designated Wilderness Areas--Cebolla Wilderness Unit and West Malpais Wilderness Unit;

2. Wilderness Study Area--Chain of Craters Wilderness Study Unit; and

3. Conservation Unit--Breaks, Brazo, Spur, Neck, Cerritos de Jaspe, Cerro Brillante, and Continental Divide subunits.



MAP B-3

EL MALPAIS NATIONAL CONSERVATION AREA

Priorities and Rationale

1. The first priority for acquisition, preferably by exchange, includes all subsurface private interest within the NCA (refer to Map B-1).

Mineral development anywhere within the boundaries of the NCA is incompatible with the Congressionally mandated goals and purposes of the NCA. Federal minerals have been withdrawn, and acquisition of private minerals would provide the same protection to the non-federal parcels. Mineral exchanges and fee acquisition have already been initiated with the principal subsurface landowners, the New Mexico and Arizona Land Company (NZ) and the Cerrillos Land Company (Santa Fe Pacific Minerals Corporation).

2. The second priority for acquisition, preferably by exchange, includes all private inholdings and edge holdings within and adjacent to the Cebolla Wilderness Unit, and most inholdings and one edge holding adjacent to the West Malpais Wilderness Unit.

The inholding in Section 1, T6N, R12W of the West Malpais Wilderness Unit is not included in this priority because a house and a barn have been built there. Most edge holdings to the West Malpais Wilderness Unit are not included because major range improvements exist on them (refer to Map B-2). The Chain of Craters Wilderness Study Unit contains no private surface; therefore, no acquisition is needed.

Increased use on private lands within wilderness areas is incompatible with the goals and purposes for which Congress designated the areas. Acquisition of private inholdings would prevent any such change in land use and improve the manageability of the areas. Acquisition of the edge holdings would provide access into the wilderness areas.

Especially important in the NCA is acquisition of private edge holdings in the Breaks subunit that provide access into the Cebolla Wilderness Unit. Acquisition and rehabilitation of Cebolla Spring and the Cebolla Spring riparian area in the Cebolla Wilderness Unit and the Brazo and Breaks subunits would ensure protection of a critical riparian area. The private portion of the Pinole Site in the Breaks subunit would be acquired under this priority. The "Old Hughes Place," a historic homestead in the Brazo subunit, may merit preservation.

3. The third priority is acquisition of scenic and/or conservation easements along the federal, state, and county highways passing through the NCA (refer to Map B-2).

Commercial development and visual intrusions along the roadways (e.g., installation of billboards) are incompatible with the goals and purposes of the NCA. Protection of the viewshed along

NM 117 in the Neck subunit, the scenic gateway to the NCA, is most important. Also to be protected are the viewsheds along I-40 and NM 53 in the Neck subunit, and along portions of CR 42 in the Continental Divide subunit.

4. The fourth priority is the Acoma Exchange, if initiated by the Pueblo of Acoma (refer to Map B-2). This exchange is mandated by the El Malpais legislation if requested by the Pueblo of Acoma.

5. The fifth priority for acquisition is lands containing natural and/or cultural resources that require management or protection, and/or lands needed for visitor access and facility development.

For those areas where private uses are incompatible with NCA goals and purposes, or where important resources are on private land, acquisition may be the only feasible means of protection. However, other options such as cooperative agreements and easements may be explored. Exchange will be the preferred method of acquisition.

All private inholdings in the Brazo and Breaks subunits should be acquired. Cebolla Spring, the Pinole Site, and the "Old Hughes Place" are included above under Priority 2 as part of the acquisition of edge holdings to the Cebolla Wilderness.

In the Cerritos de Jaspe subunit, the trailhead for the Outlaw Trail is on private land, as is part of the Bandera Flow. Extremely destructive unscientific excavation of cultural resources has occurred on private land in this subunit. Under Priority 5, the BLM would acquire any private land in Cerritos de Jaspe offered by owners if shown on Map B-2.

Surface inholdings owned by the New Mexico-Arizona Land Company in the Continental Divide subunit, as well as private land owned by any other willing sellers, would be acquired under this priority if shown on Map B-2. The BLM does not plan to acquire lands in the heavily subdivided areas of the Continental Divide subunit. Acquisition of other private inholdings in the subunit may be proposed in the General Management Plan.

As historic structures become available in the NCA, they will be evaluated for historic and architectural value for adaptive use.

6. The sixth priority is protection of private lands and resources within the NCA to benefit resources within the El Malpais National Monument (Map B-2).

Any development visible from CR 42 in the Continental Divide subunit would intrude on the natural scenic quality of the National Monument. Acquisition of scenic or conservation easements along CR 42 would protect the viewshed in the National Monument.

Proliferation of access roads into the subdivided areas within and west of the Continental Divide subunit of the NCA would also intrude on the natural scenic quality of the National Monument. The BLM and the NPS will work with Cibola County and local landowners to limit the number of access roads across the National Monument and NCA, while still providing access from outside the NCA and National Monument.

7. The seventh priority is lands on which no immediate threat to natural or cultural resources exists.

As lands become available in these other areas, they will be evaluated for their suitability for acquisition. Only exchange and sales proposals from private landowners that are in the best interest of the federal government and that meet the goals and purposes of the NCA will be pursued.

APPENDIX C

APPENDIX C

AMENDMENTS TO THE RIO PUERCO RESOURCE MANAGEMENT PLAN

INTRODUCTION

The Rio Puerco Resource Management Plan (RMP) was prepared to provide a comprehensive framework for managing the public lands and for allocating resources in the Rio Puerco Resource Area (RPRA). The RPRA includes 8,620,838 acres located within seven different counties in central New Mexico. The Rio Puerco RMP includes decisions for the former El Malpais Special Management Area (SMA) and the Continental Divide National Scenic Trail SMA.

The Record of Decision implementing the Rio Puerco RMP was signed in January, 1986. On December 31, 1987, approximately 362,600 acres in Cibola County that were included in the RMP as the El Malpais SMA, became the El Malpais National Conservation Area (NCA) and the El Malpais National Monument (NM) with the signing of Public Law (PL) 100-225.

Existing management of the El Malpais NCA is guided by the Rio Puerco RMP. However, the new designation for El Malpais necessitates an amendment to the original Rio Puerco RMP. A Notice of Intent to amend the RMP was published in the Federal Register (Vol. 54, No.12) on January 19, 1989. The El Malpais GMP is an activity plan that implements the El Malpais legislation.

This appendix summarizes decisions in the RMP pertaining to the El Malpais NCA and NM. Also identified are changes brought about by PL 100-225 and the management prescriptions proposed in the General Management Plan.

EL MALPAIS SPECIAL MANAGEMENT AREA

The Rio Puerco RMP established El Malpais SMA, which contained important natural, cultural, scientific, recreational, and scenic values. The SMA included the Rimrock, Little Rimrock, Sand Canyon, and Pinyon Wilderness Study Areas and the El Malpais Instant Study Area (USDI, BLM 1981).

PL 100-225 made several changes in boundaries and management of the former SMA with the establishment of the NCA and NM:

1. More public and private land was included within the boundaries;
2. Four Wilderness Study Areas became the Cebolla Wilderness Unit;
3. Most of the area recommended by BLM for wilderness in 1981 became the El Malpais National Monument (excluding Big Hole in the Wall); and

4. Portions of public land found not suitable for wilderness in 1981 became the West Malpais Wilderness Unit and the Chain of Craters Wilderness Study Unit.

AMENDMENTS TO THE RIO PUERCO RMP

The planned actions in the RMP for the El Malpais SMA included: (1) Develop activity plans; (2) Limit motorized vehicle use to existing roads and trails; and (3) Acquire the mineral estate. The General Management Plan proposes additional management prescriptions and actions.

Motorized vehicle use was further limited with designation of the Cebolla and West Malpais wilderness units. Mineral and surface estate has been acquired through the exchange process, but an ongoing program of land exchange will continue until acquisition priorities outlined in the BLM Land Protection Plan have been achieved (refer to Appendix B for a summary of the Land Protection Plan).

Fuelwood/Timber

The RMP identified areas for commercial and individual firewood cutting areas in North Pasture, Sand Canyon, Cebolla Canyon, Sandy Hill, and Chain of Craters. North Pasture, Sand Canyon, Cebolla Canyon, and Sandy Hill are now within the Cebolla Wilderness Unit, where cutting is not allowed. The Chain of Craters Unit will be managed to maintain its wilderness character until Congress makes a decision on wilderness designation.

The entire NCA was closed to commercial timber operations by the El Malpais legislation. Decisions in the RMP related to forestry will be replaced by the preferred management prescriptions and actions identified in the General Management Plan. These are outlined under the issue of natural resources for each management unit and summarized in the Chapter 12.

Wildlife

The RMP contained specific decisions aimed at enhancing wildlife habitat, minimizing conflicts between wildlife and domestic stock, developing wildlife waters, and acquiring and protecting riparian areas. The preferred management prescriptions and actions outlined under wildlife, range management, and natural resource issues in the GMP will replace RMP decisions. Habitat enhancement and water development will be managed under the BLM wilderness policy within designated wilderness and under interim management policy in the Chain of Craters Unit. Wildlife management prescriptions are outlined under the wildlife issue for each management unit, and are summarized in Chapter 11.

Recreation

Several Rio Puerco RMP decisions pertained to development of recreational facilities, interpretive plans, cooperative agreements with Acoma Pueblo, and acquisition of land. The locations slated for development of recreational facilities included areas now administered by the National Park Service or within designated wilderness. The preferred management prescriptions listed in the GMP under recreation, wilderness, and facility development issues for each unit will supercede those in the RMP.

Priorities for acquisition are outlined in the LPP and include private land that will enhance recreation or protect resources (refer to Appendix B).

CONTINENTAL DIVIDE TRAIL SMA

The National Trails System Act of 1968 (PL 90-543, as amended) authorized the study of the Continental Divide National Scenic Trail. A portion of the trail treadway was proposed in the RMP and established as an SMA. The treadway was proposed to parallel New Mexico 117 and BLM inventory roads that traveled through the Rimrock, Little Rimrock, and Sand Canyon Wilderness Study Areas. A portion of the treadway was to traverse the El Malpais SMA through the heart of the recent lava flows.

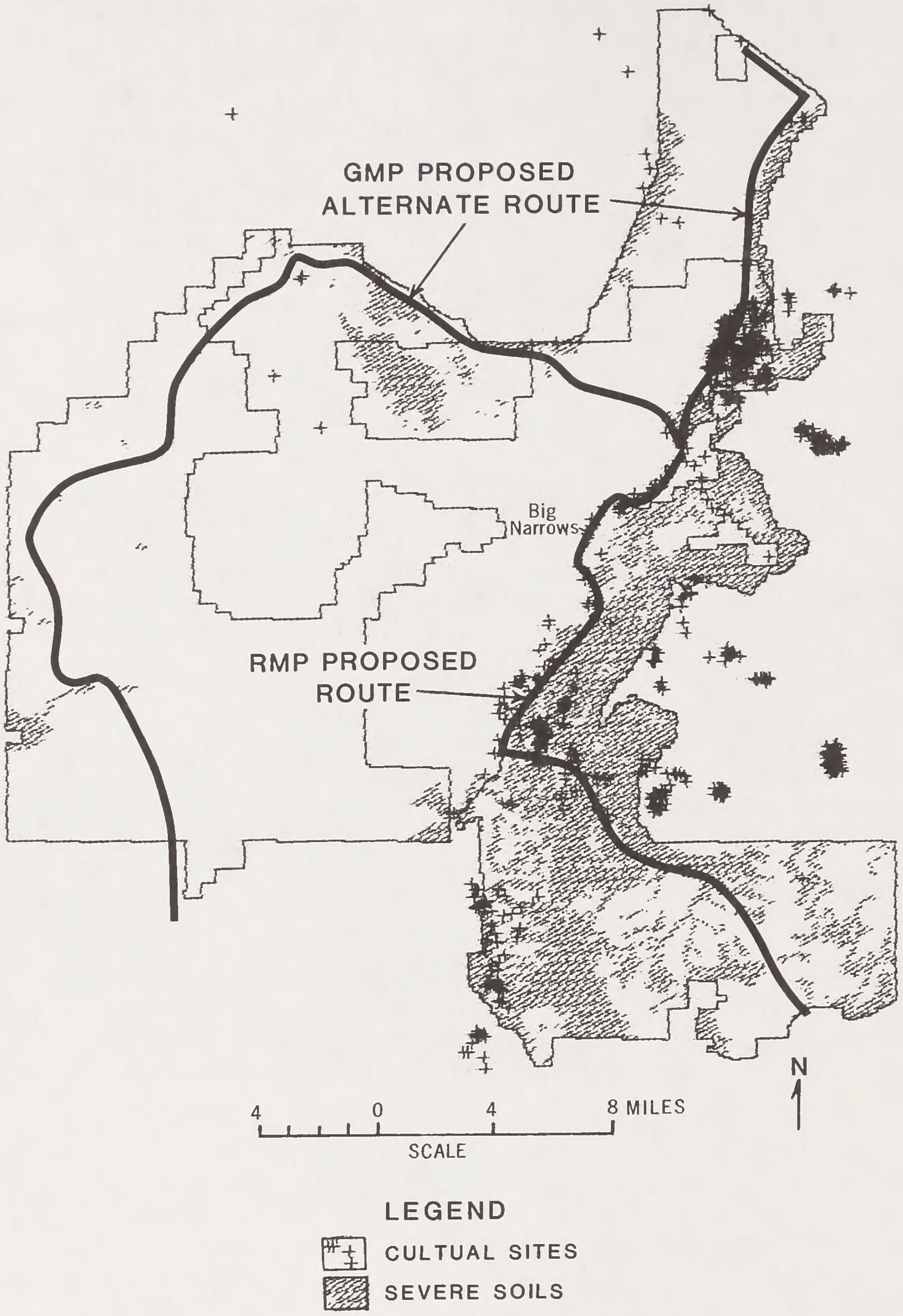
New information on soils and cultural site density has led to a reassessment of the location of the Continental Divide Scenic Trail as it passes through El Malpais. An alternate route has been considered in the General Management Plan that was not proposed in the RMP. This proposed alternate route will amend the RMP as it relates to the southern segment of the Continental Divide National Scenic Trail through the Rio Puerco Resource Area (refer to Map C-1).

A route through the west side of the NCA is preferred because it avoids the highly erodible soils located on the east side and the high density of cultural sites preserved in the Cebolla Wilderness. The western route travels through an area of low cultural site density.

Potable water will be available for hikers at two locations along the proposed route, at the BLM Ranger Station on NM 117 and at the NPS Visitor Center near Bandera Crater. The National Park Service has worked with the BLM in selecting the trail corridor; the trail will cross the National Monument along what is now the Zuni-Acoma Trail.

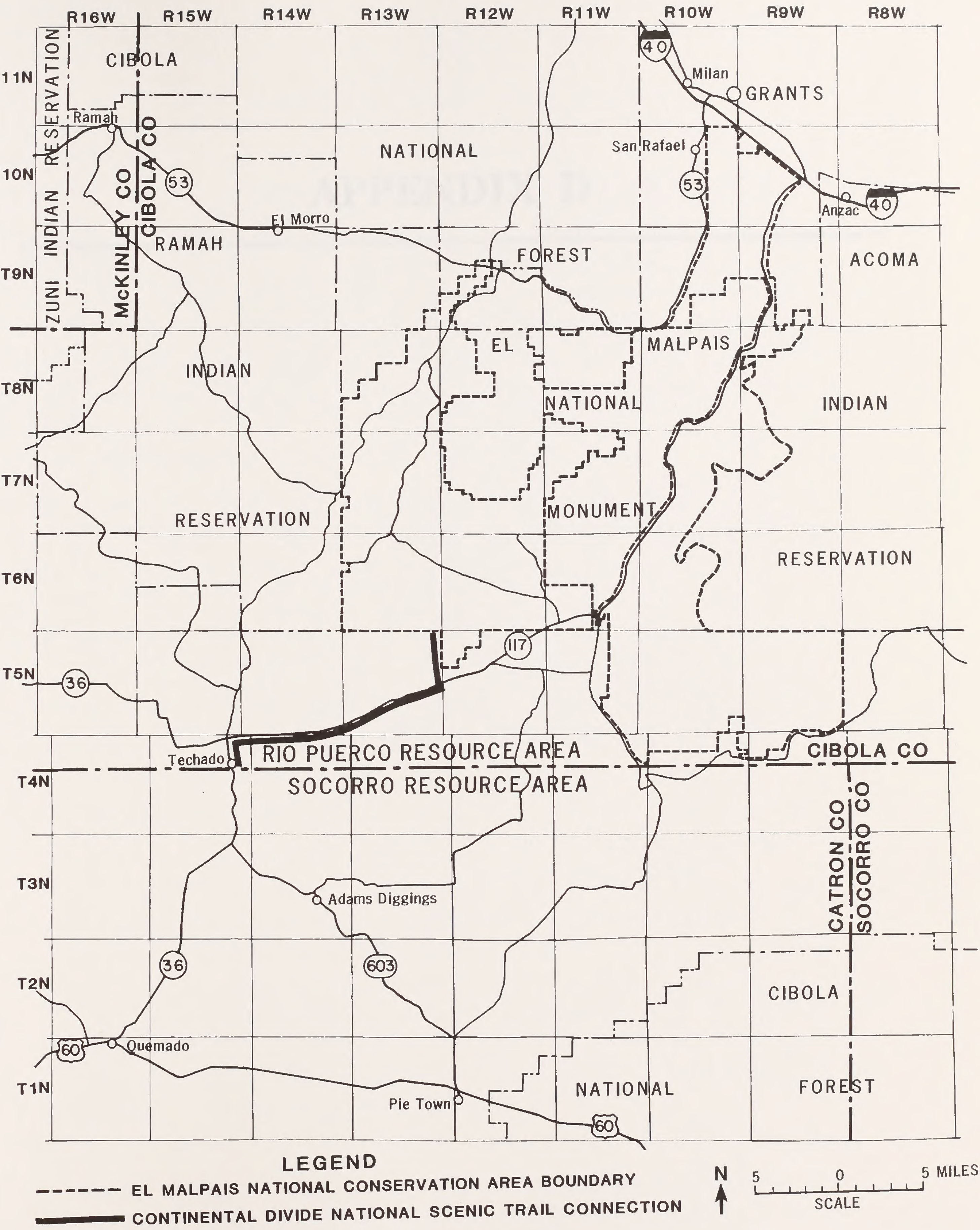
Once the trail leaves the NCA, it will connect at Pietown to BLM-administered lands in the Socorro Resource Area along the route illustrated on Map C-2. The connection will use existing roads and ways because most of the land is privately owned. The roads include paved NM 117 and NM 36, a dirt road.

Actual designation of the trail will be done through the U.S. Forest Service, the lead agency for the project.



MAP C-1

ALTERNATE ROUTES FOR
THE CONTINENTAL DIVIDE NATIONAL SCENIC TRAIL
(AS THEY RELATE TO SEVERE SOILS AND CULTURAL SITE DENSITY)



MAP C-2

CONTINENTAL DIVIDE NATIONAL SCENIC TRAIL
(CONNECTION WITH BLM SOCORRO RESOURCE AREA)

APPENDIX D

APPENDIX D

SUMMARY OF PUBLIC INPUT TO DATE

INTRODUCTION

Public input for the El Malpais GMP has been solicited in four formal ways. Meetings and workshops were held in July and December, 1988 during the issue identification and alternative development stages. The El Malpais Update had a "Newsletter Comment Sheet" in June, 1988 and an "Alternatives Workbook" in December, 1988. Coordination meetings have been held with local Native American groups during the entire process. In addition, the BLM has recieved letters written by the public at every stage of preparation of this GMP. Solicitation of public comment was coordinated with the National Park Service because the NPS is preparing a parallel GMP for El Malpais National Monument.

INPUT FROM MEETINGS AND WORKSHOPS

The first set of public meetings was held to identify the issues and concerns that must be addressed in the GMP. Potentially interested publics were notified through the El Malpais Update. The first meeting was held on June 15, 1988, at the Cibola County Convention Center in Grants, New Mexico--and the second on June 16, 1988, at the New Mexico Museum of Natural History in Albuquerque, New Mexico. Fifty-two people attended the meetings and voiced their concerns to El Malpais planners. A total of 275 separate comments were received. Responses ranged from voicing concern about preserving El Malpais' environment to questions regarding land ownership rights and types of activities that may continue in the newly created NCA. Most of the responses fell into nine categories of issues:

1. Native American Issues

   - How can access into the NCA and NM for religious and resource uses be provided to Native Americans?

   - How can the BLM and the NPS provide protection for prehistoric and contemporary religious sites?

   - How can tribes be involved in the planning process, archeological surveys, and the interpretation of natural and cultural resources?

   - Can the Acoma Tribe purchase lands east of Route 117, which are of particular importance to the tribe?

2. Recreation

   - How, when, and where will such facilities as trails, visitor centers, and campgrounds be developed?

- How will the BLM and the NPS provide search-and-rescue services for lost or stranded visitors?

- How, when, and where will fees and permits be required?

- How can the BLM and the NPS provide for the interpretation of natural and cultural resources while protecting these resources from over-use?

3. Land Acquisition and Restrictions

- How, when, and for how much money will land be acquired?

- Are land acquisitions being prioritized? If so, what is the process?

- What effort will be made to control trespass onto private land?

- What kinds of controls will be placed upon private land until it is acquired?

- Will Land and Water Conservation Funds be used to acquire private lands?

4. Wilderness and Road Closures

- How can we control road use by the public?

- How do the BLM and the NPS plan to implement, monitor, and enforce restrictions on vehicular traffic, archeological sites, woodcutting, and hunting?

- How will opportunities to add important wilderness sites be considered in the NCA and NM?

5. Facility Development

- To what extent will trails, roads, and campgrounds be developed in the NCA and NM?

- Can the El Malpais area be kept as primitive as possible?

- Has a final decision been made about the exact location of the permanent visitor/orientation center?

- Will recreational development affect water quality or quantity in the NCA and NM?

6. Wildlife

- To what extent, and with what funds, will habitat manipulation be planned for the NCA and NM?

- How will wildlife populations be managed when they range in both the NCA and NM?
- Will the public be restricted from sensitive wildlife-use areas during all or part of the year to protect wildlife?
- Will Native Americans have rights to collect raptors within the NCA and NM?
- Will wildlife management take priority over grazing in the NCA and NM?

7. Grazing

- What updated range-condition assessments will be made? What adjustments in livestock numbers will be made, based upon these assessments?
- What effects will the NCA, NM, and designated wilderness areas have upon grazing privileges, range improvements, and the values of grazing permits?
- How will grazing be phased out in the NM?

8. Cultural Resources Management

- What specific guidelines and common management goals will be established by BLM and NPS for the protection and interpretation of cultural resources?
- How will local Native American tribes be involved in the protection and interpretation of archeological resources?

9. Natural Ecological Process Management

- Will visitor use be monitored or controlled initially on the basis of special management units, and in the long run on the basis of the carrying capacity of each specific area?
- How will such unique resources as ice caves, lava tubes, flora, and fauna be managed?
- How will watersheds and fuelwood areas be managed?
- Will a fire control policy be developed for the NCA and NM?

The second set of public meetings was held to get public reactions, ideas, and comments on BLM alternatives for planning the future of El Malpais. The first of the series of meetings was held December 14, 1988, at the Cibola County Convention Center in Grants, New Mexico--and the second on December 15, 1988, at the Winrock Inn-Best Western in Albuquerque, New Mexico. Potentially interested publics were notified through the El Malpais Update. Sixty-three people attended the meetings and were placed into four worksgroups to discuss Recreation, Wilderness, and Facility Development Issues; Native American and Cultural Resources Issues; Landowner Issues; and Biological and Natural Resource Issues. Public comments were recorded within each workgroup and then presented to the entire group for additional input.

Some of the comments brought out during the alternatives public meetings are as follows:

Recreation, Wilderness, and Facility Development Issues

- Limit development of facilities in areas with existing roads.
- Continue to enforce regulations.
- Provide for public education to protect fragile resources.
- Limit access to the more fragile caves and resources.
- Upgrade Cibola County Road 42.
- Maintain the serenity of El Malpais.
- Provide guided tours for visitor safety and resource protection.

Native American and Cultural Resource Issues

- Provide for consultation and partnership with Native Americans throughout the planning process.
- Native Americans can provide services for construction, facility design, and interpretation.

Landowner Issues

- Landowners need to be informed of their rights to develop land within the NCA and NM boundaries.
- The BLM and the NPS need to provide information to landowners on land acquisition priorities and the appraisal process.
- Upgrade Cibola County Road 42.
- Landowners, the BLM, and the NPS can work together to come up with designs that will be the least impacting on natural and cultural resources on private lands where development is proposed.

Biological and Natural Resources Issues

- Allow wood-cutting instead of burning.
- Provide information to the public about natural resources.
- Review predator control needs and methods.
- Maintain existing range improvements.
- Allow habitat manipulation to restore degraded areas.
- Reduce wildlife-human interaction by limiting access.
- Inventory biological and geological resources.
- Protect critical habitat areas, sensitive habitat areas, and areas that are both critical and sensitive.
- Allow research and public education about biological resources.

Comments from both meetings were used along with BLM information to develop preferred alternatives for the GMP.

INPUT FROM EL MALPAIS UPDATE COMMENT SHEET AND ALTERNATIVES WORKBOOK

The El Malpais Update has been used to inform the interested public and internal personnel on the issues and current status of the El Malpais GMP. In the first El Malpais Update issue, a mail-back "Comment Sheet" was sent, asking readers to identify concerns to be addressed under nine separate issues for the GMP. Of the 325 comment sheets sent, 18 were returned to the planning team for consideration. Information received from the comment sheets, along with public comment received during the issue identification public meetings, was used to develop planning alternatives by issue.

In the third El Malpais Update a mail-back Alternatives Workbook was sent. The Alternatives Workbook presented to the public a summary of the BLM's management alternatives. Eight planning issues were presented under separate headings. Each described the BLM's proposed objectives for managing the NCA under the "Low Change" or "High Change" alternative. The public was asked to choose the alternative that most closely matched what they thought would be the most appropriate management level for that issue. Space was also available for written comments. Of the 750 alternatives workbooks sent, only 51 workbooks were returned, representing a very low response rate. Responses from the BLM Alternatives Workbook are summarized below:

TABLE D-1

BLM ALTERNATIVES WORKBOOK SUMMARY

Issue	Alternative	Percent Favoring Alternative	No. of Objectives	Average No. Responses per Objective
Recreation	High Change	18	16	39
	Low Change	15	18	41
Facility Development	High Change	14	15	39
	Low Change	9	17	43
Wilderness	High Change	18	13	30
	Low Change	12	18	39
Cultural Resources	High Change	14	18	42
	Low Change	9	14	31
Native	High Change	5	20	46

American	Low Change	3	16	36
Grazing Management	High Change	12	14	32
	Low Change	8	16	37
Wildlife Habitat	High Change	14	18	40
	Low Change	12	16	37
Natural Resources	High Change	18	15	35
	Low Change	19	20	48

A more detailed summary of comments titled "El Malpais GMP Public Involvement Results" was used to develop preferred alternatives for the GMP.

LETTERS AND OTHER PUBLIC CONTACTS

Letters were received from eleven individuals during the issue scoping and alternative identification public input phases. In addition, thirteen public contact records that address planning issues are on file. The total number of comments on each issue category from letters or public contact records have been included with written comments received from the alternatives workbook and are summarized below:

TABLE D-2

SUMMARY OF WRITTEN COMMENTS

Issue Category	Total Comments	Subissues	No. of Comments
Grazing	13	prairie dogs	2
		rabbitbrush removal	1
		improvements	3
		fuelwood	4
		native species	1
		private land	2
Wildlife Habitat	14	bighorn sheep	1
		rabbitbrush	1
		fire	3
		prairie dogs	3
		forage/browse mgmt	1
		water	3
		native species	1
		grazing	1
Natural Resource Management	42	wildlife	1
		fuelwood	10
		public access	3

		public access	3
		County Road 42	14
		Christmas trees	2
		institutes/museums	1
		water	2
		wildlife trees	2
		vegetative treatment	1
		Native Americans	2
		air quality	1
		poaching	1
		native species	2
Cultural Issues	13	vandalism	5
		Kowina	1
		patrols	1
		NCA designation	1
		previous studies	1
		scientific use/nonuse	3
Recreation Issues	47	interpretive material	1
		institutes/museums	1
		Native Americans	3
		road closures	1
		camping/picnic areas	2
		parking lots/pullouts	5
		trails	14
		signs	7
		private lands	6
		realigning Hwy 117	2
		County Road 42	5
Native American Issues	5	public vs. NA interests	4
		information sources	1
Wilderness Management	18	maximize risks	4
		research/institutes	3
		picnic areas/parking	4
		camping	1
		trails	1
		public access/vehicles	2
		limits of accept. change	1
		cherrystem roads	1
		County Road 42	1
Facility Development	6	information kiosk 42/117	1
		Mertz Ranch	1
		BLM Ranger Station site	3
		handicap provisions	1
Other Comments Related to Objectives	5	private landowner concern	3
		hunting/trapping	1
		support organizations	1

NATIVE AMERICAN CONSULTATION

To fulfill the intent of Public Law 100-225, the BLM has engaged in consultations with Native Americans throughout the planning process. A list of these meetings is on file at the Rio Puerco Resource Area Office in Albuquerque.

APPENDIX E

Appendix E

Geographic Technologies and Biophysical Land Unit Methodology

PHILOSOPHY

Biophysical Land Units (BLUs) are a manifestation of the geographic concept of regionalism. The regional concept of natural areas, although philosophically widely accepted, has in the past usually been defined with largely descriptive criteria.

With the recent rapid evolution of geographic technologies [Geographic Information Systems (GIS) and satellite remote sensing], it is becoming possible to more scientifically acquire and quantify geographic data than with previous methods. Geographic technologies also provide the added benefit of being able to systematically and confidently repeat a model through time.

The power of digital geographic analysis and Boolean logic, combined with spectrally-based terrain observation data, provides the scientific foundation for the concept of Biophysical Land Units, and includes the ability of portraying both physical and cultural geography. The availability of this kind of information is crucial to resource management and decisionmaking. Of further interest is the use of these geographic concepts with temporal data sets, to monitor and quantify change.

Using the concept of Biophysical Land Units, or ecological landscapes, in resource management is not new. As stated by Hills (1976) the term "biophysical" was first applied to a national land classification program launched by the government of Canada in 1967. The term was meant to emphasize classification of ecological landscapes by both "biotic (living) and physical (non-living)" elements (Hills 1976:73). Hills also emphasizes the important holistic and transactional characteristics of biophysical land classification.

The Canada experience was further articulated by Walmsley in 1976. He was concerned with the development of a biophysical land classification system for resource use, environmental management, resource allocation, and conflict resolution. Parameters included in Walmsley's criteria were: physiographic subdivisions, vegetation zonation, terrain features, bedrock geology subdivisions, aquatic characteristics, soil descriptions and climatic parameters. Also noted was the fact that vegetation is an important indicator of the state of other ecological factors, and is therefore a key ingredient in defining Biophysical Land Units. Finally, using GIS and Biophysical Land Units for monitoring change is supported by Walmsley's view "that the biophysical system is not a finite entity but provides the means by which its application can change, not only in time but also geographically, depending on the important attributes of the landscape considered" (Walmsley 1976:21).

Monitoring and quantifying change is a priority important to resource management, and a primary consideration in the model of Biophysical Land Units and geographic technologies. A theoretical avenue already existing within the Department of the Interior, and that could be expanded to accommodate the model of Biophysical Land Units and geographic technologies is the Limits of Acceptable Change (LAC) system. Developed by Stankey, Cole, Lucas, Peterson, and Frissell (1985), LAC is a strategy to improve "...wildland recreation management through definition of more explicit, measurable objectives." Key to the LAC framework and its development (and expansion beyond recreation applications), for use in a NCA is the notion that LAC "...represents a reformulation of the carrying capacity concept, with the primary emphasis now on the conditions desired in the area, rather than on how much use an area can tolerate" (Stankey, et al. 1985:iii).

APPLICATION

The use of the model of Biophysical Land Units and geographic technologies must begin at a generic core of spatial information (soils, surface water, terrain characteristics, and vegetation cover). It is crucial that this framework be flexible enough to be updated and enhanced for a unique local region, but at the core remain generic and standardized for transfer over many regions.

GIS has the power to allow sampling and spatial analysis, without loss of accuracy, at a variety of scales. Generic, regional, or preliminary questions can be considered at a small scale (low resolution). For unique local regions, or particular locations of interest, large scale data (high resolution) can be accessed for specific questions. The key is to provide resource managers with quantifiable yet dynamic, trackable, and repeatable information with which to make decisions and monitor change.

BLUs were delineated for the El Malpais NCA and National Monument. Delineation of Biophysical Land Units for El Malpais rests on four components, or GIS layers (themes). These layers are: soil type, surface water, terrain characteristics, and vegetation cover.

The soils data were acquired from the Soil Conservation Service and digitized at a scale of 1:24,000. Surface water data were available from USGS "Streams" Digital Line Graphs (DLG), at a scale of 1:100,000. These data were subsequently compared to BLM field inventory data digitized at 1:24,000. Terrain data were available initially from USGS Digital Elevation Models (DEM), acquired at 1:250,000, then updated with DEM data from USGS at 1:24,000. Finally, baseline vegetation cover data were classified from Landsat Thematic Mapper (TM) data.

VEGETATION COVER CLASSIFICATION

Classification of vegetation cover was accomplished in cooperation with Technology Application Center (TAC) at the University of New Mexico. A Landsat scene from June, 1984 provided the satellite data used for the project. TM channels 2 (green), 3 (red), and 4 (near-infrared), the acknowledged channels for determining vegetation types, were selected for classification.

Prior to the spectral classification of the raw TM data, TAC applied standard "preprocessing" functions. These functions were: geometric correction, radiometric correction, and atmospheric correction. Georeferencing was then accomplished using the bilinear interpolation method with 36 control points, and projecting the data to the Universal Transverse Mercator (UTM) projection.

Once preprocessing was completed, TAC processed the digital image using an "unsupervised classification" approach. In this approach no spectral signature to vegetation relationships were established prior to spectral classification. The unsupervised classification yielded 44 spectral classes.

Following spectral classification, two stages of field verification were undertaken by BLM according to professionally established standards. In the first stage, 1:24,000 scale plots of each of the 44 spectral classes were overlayed with a mylar transparency of the Cerro Brillante USGS topographic quadrangle for use in field location. Additional field guides included statistical plots of the 44 spectral classes (with and without tentative groupings), and aerial photographs. These field guides were used to locate, observe, and identify vegetation. Distances were then paced off between groups of trees, and areas of tree clusters were estimated relative to areas of meadow surrounding them (or surrounded by them). Through this field assessment, 10 aggregate classes were defined.

The second stage of field verification was accomplished with the 10 aggregate classes, digitally grouped and plotted by TAC. A second USGS quadrangle, North Pasture, was selected, and verification was completed using the same methods and field guides as those used in the first stage. Field assessment of the aggregate classes confirmed the accuracy of the vegetation groupings.

Of these verified classes, two classes represented small areas of irrigated agricultural land, both located outside the El Malpais National Conservation Area and National Monument. The vegetation classification descriptions for El Malpais, therefore, are for 8 vegetation/land cover classes (refer to Table E-1). Documentation in greater detail of the process of spectral and vegetation classification, field verification, and preliminary

BLU model testing is contained in a Master's thesis for the UNM Department of Geography (Carroll 1989) and is on file in the Rio Puerco Resource Area.

BIOPHYSICAL LAND UNITS

The Biophysical Land Units of El Malpais were derived through Boolean logic using the four previously described components (soils, surface water, terrain characteristics, and vegetation cover). Specifically, Boolean operations available in the MAPS software package, currently the BLM standard, were employed, because both DEM and Landsat data are in raster (cell) form.

It is extremely important to recognize that GIS Boolean logic derives some information that cannot be evaluated visually or in the field. Derived data that is delineated by 2 or more specific parameters or limits can only be approximated, or can be missed entirely, by conventional overlay methods.

First, soils data from the Soil Conservation Service were put into 16 logical groupings for El Malpais. These 16 groupings, their characteristics, and descriptions are presented in Table E-2. The 16 soil groupings and the 8 vegetation classes were overlayed and processed in MAPS. The resulting derived data were then overlayed with slope parameters extracted from DEM data. Finally, surface water data were overlayed on the derived data. With these core BLUs thus processed, additional physical, cultural and administrative themes are being employed in GIS overlay analysis to answer resource management questions.

Descriptions of the El Malpais Biophysical Land Units, and the parameters used in the analysis process can be found in Chapter 1. Graphic representation of the concept is displayed in Figure E-1.

Three more temporal data sets of vegetation/land cover, derived from Landsat scenes of June 1988, September 1988, and July 1989 (just after a fire in the West Malpais Wilderness), are soon to be added to the El Malpais database. These additional layers, based on successful preliminary testing, are expected to provide spatial evidence for change quantification and monitoring for LAC, and management analysis and decisionmaking.

Table E-1

El Malpais Vegetative Classes

Eight vegetative classes were derived from 44 Landsat image classes generated from a scene taken in June, 1984. These eight classes reflect dominant vegetative types found in El Malpais National Monument and NCA. They reflect a transition from sparse vegetation to forest. The eight classes are as follows.

Lava/lichen/pygmy scrub: This class is characterized by widely dispersed ponderosa pine, pinon, and juniper. Some of these are stunted and look vaguely like bonsai. Stunted ponderosas tend to be less than 10 ft. tall. Shrubs, forbs, and lichens form a complex understory. Shrubs include apache plume, New Mexico privet, currant, oak spp., and rabbitbrush. Forbs include composites, mint relatives, kochia, and many "wildflowers." Over 70 species of lichen have been identified on the lava. The many cactus species should be surveyed.

The ecological edge effect where lava meets the surrounding sedimentary rock is characterized by tall ponderosa pines undergrown by grass, clumps of shrub, oak, pinon, and juniper. This edge rarely appears on the composite map of the entire El Malpais area at 1:000,000. It appears clearly on 7.5 minute maps of specific areas.

Sparse/bare: This class is characterized by exposed rock or soil surface mixed with grass patches and low, scattered forbs, and shrubs. Grasses include blue grama, galleta, and many warm season grasses which may not be present at the time the Landsat image was taken in June. An image taken in late summer could result in some of this classification being placed in grass/shrub category. Forbs typical in sparse/bare category include kochia, salsola, many composites and "wildflowers," and large patches of sunflowers which offer a significant fall or winter seed source for many species of birds. Western wheatgrass and sunflowers are dominant in playas.

Grass/shrub: This class is characterized by blue grama in sod habit interspersed with forbs, mixed grasses, and shrubs such as tetrademia, sage species, snakeweed, and rabbitbrush. Rabbitbrush flats are included in this classification. It is possible that nearly pure stands of rabbitbrush would be identifiable from Landsat images taken later in the year. Small clumps of junipers or pinons are scattered in some areas that fall into this category, but the clumps are small enough and dispersed enough that the imaging process averages them out.

Shrub/conifer: This class is typified by open mixed conifer forest with a grass/shrub understory. Open shrubby meadows are interspersed with the conifers forming a mosaic. Tree clusters are situated so that approximately equal areas of conifer and understory are exposed to vertical view. At lower elevations (6,800-7,600 ft.) and on south facing slopes, the conifers are usually pinon and juniper species with an understory of blue grama, rabbitbrush, snakeweed, tetrademia, currant, rhus, and forbs, and mixed grasses. As elevation increases, and on north-facing slopes, ponderosa pine becomes a common component in the conifer mix or becomes dominant. Alligator bark junipers also appear. Oak species become a dominant in the understory. In the northwestern corner of the El Malpais, Douglas fir is found in the conifer complex and aspen is included in the understory.

Mixed conifer: This class is characterized by the same species composition as is described in the shrub/conifer class, but the areas covered by conifers are proportionately thicker and larger than the small meadows interspersed between tree patches. Less understory is exposed to vertical view.

Some areas included in this class are characterized by mature trees with an understory of young trees of the same species from 1 to 30 years of age in addition to the typical understory.

Pinon/juniper woodland: This class is characterized by thick growth of mature to nearly decadent trees. Some ponderosa pine may be found interspersed but is not a dominant species. Trees form a canopy overhead so that very little understory is exposed to a vertical view. This class is patchy and only very small areas are found in El Malpais.

Deciduous: The deciduous class is patchy and occurs only in very small areas. It is represented by stands of oaks, and small groves of aspens. Willows and riparian species that follow drains are not visible on the composite 1:100,000 scale map of the area but do appear on 7.5 minute maps that include drainages.

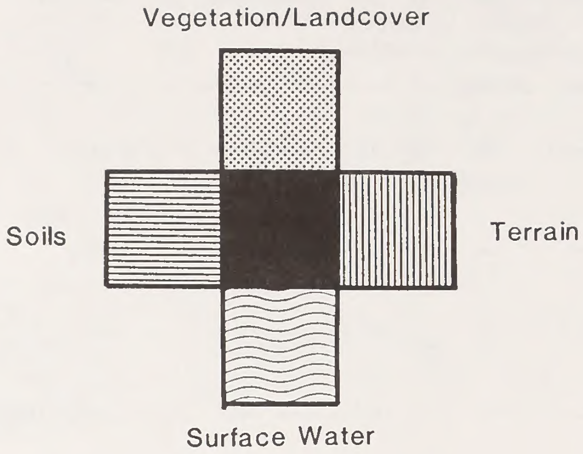
An ecological effect occurs along the lava-soil interface where very large oaks appear, either in small groves or as individual specimens. These are small enough areas that they do not appear on the 1:100,000 vegetative maps but are worth consideration in management decisions.

Ponderosa parkland: This is a climax vegetation type that is rarely seen in logged areas. It is typified by large, mature (50+ years old) individual trees interspersed widely in grassy meadows. Small clumps of shrubs may be found in the understory, but grasses such as Junegrass, mountain muhly, mutton bluegrass, and grama species dominate. This vegetative type is maintained by regular fire.

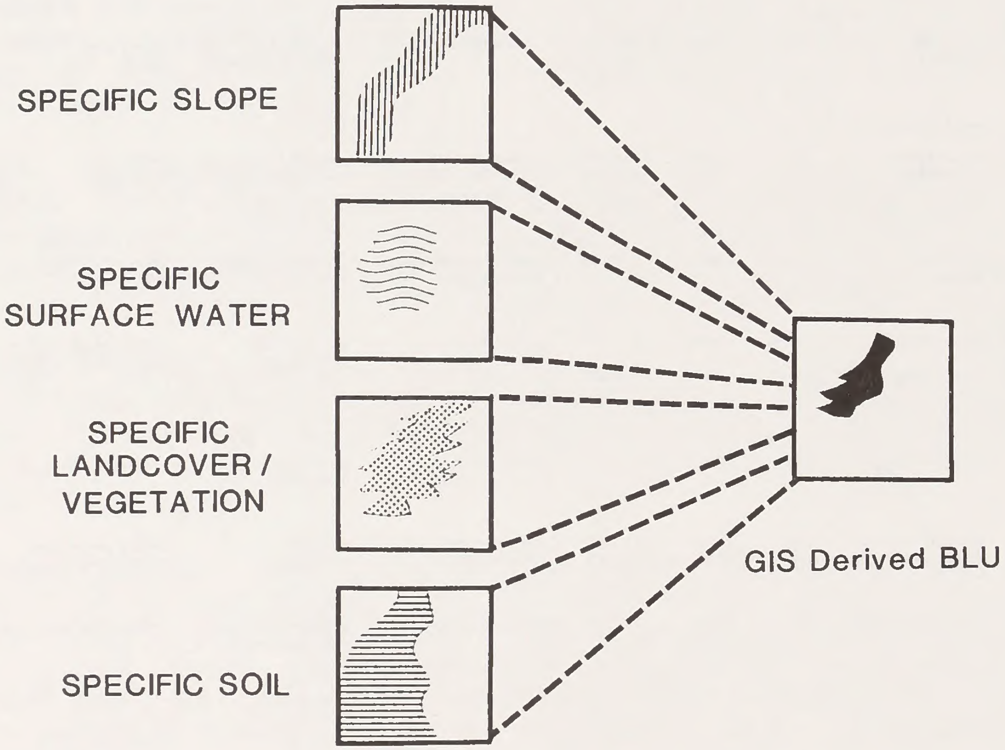
CLASS	TYPE DEPOSITION	EROSION POTENTIAL		% SLOPE	VEGETATIVE TYPE	RANGE SITE USES	SOIL TEXTURE	LANDFORM	Group
		WIND	WATER						
(320,330/582) (514/523)	alluvium/eolian	low low	mod. mod.	1 - 15%	Ponderosa parkland	wood production grazing	sandy clay loam cobbly loam basalt	fan terraces ridges, depressions	1
(284/) (591/315/278)	alluvium alluv./colluvium	low	mod.	15 - 50% 2 - 30%	Ponderosa/Doug fir/ Oak/shrub	Timber/graz.	cobbly loam cobbly clay loam	mountain slopes, hills, ridges, escarpments	2
(10)	alluvium	mod.	mod.	1 - 12%	Ponderosa/Doug fir	recreation	sandy	lava flows	10
(218)	alluv./eolian	mod.	mod.	1 - 10%	grasses/forbs	grazing	clay loam	hills, ridges, interlava valleys	3
(30)	alluvium/ lacustrine	low	low	0 - 2%	alkali grass	grazing	loam	flood plains, old lake	4
(*424)	eolian	*high	low	1 - 12%	grass, shrub, Pinon/Juniper	grazing	sand	dunes/interdune ridges	5
(*257/62)	alluvium	mod.	*high	1 - 5%	grass, shrub	grazing/wildlife	sandy clay loam	flood plains, drains, fans	6
(310)	eolian/ alluvium	low	mod.	2 - 15%	Ponderosa pine, Doug fir	grazing X-mas trees timber	granite loam	*granite hills	7
(570/406)	Alluvium/ colluvium	low	mod.	*2 - 55%	grass, scattered trees	grazing WILDLIFE	cobbly, sandy loam	hills, ridges, escarpments	8
(40/50/52/55) (57/60/61)	Alluvium (Saline)*	mod.	low	0 - 3%	grass/forb	irrigated urban development	sandy clay loam	flood plains	9
(200/505/20) (535/525/259) (620/586/536) (25/)	mix alluvium alluv./eolian coll/eolian	low	mod.	1 - 10% 3 - 20%	grass/shrub/P.J. (increase to rabbit brush)	grazing, wood production	sandy clay loam	fan terraces, valleys, flood plains	11
(518/290) (291/)	alluvium/ eolian	low	mod.	1 - 10%	Pinon/Juniper shrub, mix conifer	irrigated crops, grazing	loam/cobbly loam over basalt	lava flows, basalt caps	12
(625/560/550) (581/520/555) (577/579/575) (130)	alluv./eolian coll/eolian	low/mod. low	mod. mod.	1 - 10% 3 - 20%	grass/shrub mix conifer	grazing/wood production	cobbly sandy loam grass sandy loam	mesa tops, hills, swales	13
(500/522)	coll/eolian	low	mod.	*5 - 50%	mix conifer	grazing/wood production	gravelly loam	cinder cones	14
(120/515) (485)	alluv./colluvium eolian/colluv.	low low	*high *high	3 - 60% 15 - 65%	Pinon/Juniper grass/shrub	fuelwood grazing	cobbly sandy loam stoney loam	ridges, hills, side slopes	15
(615)	alluv./collivium	low	*high	3 - 55%	Ponderosa/Oak	grazing wood production	cobbly clay loam	mountain sides ridges, escarpments	16

TABLE E-2

EL MALPAIS SOIL GROUPINGS



BLU CORE COMPONENTS



BOOLEAN DERIVED BLU CORE DATA

FIGURE E-1

Glossary

Atmospheric correction: A procedure that compensates for effects of selectively scattered light in multi-spectral images.

Attribute: Non-spatial information associated with a geographic element.

Boolean: A logical combinatorial system that represents relationships between entities (data sets) symbolically.

Cell: The basic element of spatial information in the raster (grid) format.

Database: Interrelated information stored systematically.

Derived Data: Information secondary to original input data, that exists as a result of overlay analysis (Boolean logic).

Digital: Representation of data in discrete, quantized units or digits.

Digital elevation model (DEM): A quantitative model of landform (terrain) in digital form.

Element: A fundamental unit of geographical information (point, line, area).

Geographic Information System (GIS): A system containing geographic (spatial) location data, stored as points, lines, areas, cells or pixels, and providing the ability to overlay and derive new data through Boolean logic.

Geometric correction: A procedure that corrects spatial distortions in an image.

Landsat: A system of earth observation satellites (space remote sensor platforms) launched by the United States of America.

Layer: A logical separation of geographic data according to theme.

Model: A systematic, scientific, quantifiable, and repeatable pathway or process.

Overlay: Stacking georeferenced data for reference, analysis, or derivation.

Pixel: Contraction of "picture element"; the smallest unit of a grid or digital image.

Radiometric correction: A procedure that corrects contrast distortions in an image.

Raster: A regular grid of cells (pixels).

Spectral classification: Process of assigning individual pixels of an image to categories on the basis of spectral reflectance characteristics.

Spectral reflectance: Reflectance of electromagnetic energy at specified wavelength intervals.

Spectral signature: Spectral characteristic(s) by which a material or object may be defined on an image.

Theme: A subject or topic of information. In geographic terms, a specific layer of information.

Vector: In GIS, expressing information in the form of magnitude, direction and connectivity.

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APPENDIX F

APPENDIX F

RECREATION OPPORTUNITY SPECTRUM

INTRODUCTION

The Recreation Opportunity Spectrum (ROS) (BLM Manual 8320) provides a framework for stratifying and defining classes of outdoor recreation opportunity environments. As conceived, the ROS has application to all lands, regardless of ownership or jurisdiction.

Recreation opportunities can be expressed in terms of three principal components: the activity, the setting, and the experience. Possible mixes of activities, settings, and recreation experience have been arranged along a spectrum or continuum, ranging from primitive to urban (see Table F-1). Rural and Urban recreation opportunities are not relevant to the public land in the RPRA and are not discussed in this appendix.

RECREATION OPPORTUNITY SPECTRUM MANAGEMENT OBJECTIVES

ROS management objectives are defined below.

Primitive Zone

The primitive zone is managed to be essentially free from evidence of man, man-induced restrictions, and controls. Motorized vehicle use within the area is not permitted. The area is managed to maintain an extremely high probability of experiencing isolation from the sights and sounds of others (not more than 3-6 group encounters per day), independence, closeness to nature, self-reliance through the application of backcountry skills, and an environment that offers a high degree of challenge and risk.

Backcountry use levels and management of renewable resources are dependent on maintaining natural ecosystems and primitive experience levels. The consumption of renewable resources is subject to the protection of backcountry recreational values. Grazing is allowed, subject to restrictions placed on the use of motorized vehicles. Recreational activities occurring in this zone include backpacking, hiking, camping, swimming, horseback riding, and nature study.

Frequency of managerial contact with users is very low.

Semi-Primitive Non-Motorized

Semi-primitive non-motorized areas are managed to be largely free from the evidence of man, man-induced restrictions, and controls. Motorized vehicle use is prohibited. Limited facilities for the administration of livestock and visitor use are allowed, but off-site administration is encouraged. Project designs should stress protection of natural values. Areas are managed to maintain a good probability of experiencing minimum contact with others, self-reliance through the application of backcountry skills, and an environment that offers a degree of risk and challenge.

Backcountry use levels and management of renewable resources are dependent on maintaining ecosystems comparable to naturally-occurring ecosystems. The consumption of renewable resources is subject to the protection of backcountry recreational values. Grazing is allowed, subject to restrictions placed on use of motorized vehicles. Facilities associated with grazing are limited to those necessary for maintaining existing numbers, adequate distribution, and seasons of use, consistent with the allotment management plans. Recreational activities occurring in this zone include climbing, backpacking, hiking, picnicking, viewing scenery, camping, horseback riding, and nature study.

Frequency of managerial contact with users is low.

Semi-Primitive Motorized

Semi-primitive motorized areas are managed to provide a predominantly natural or naturally-appearing environment. Evidence of man, restrictions, and controls are present but subtle. Motorized vehicle use is permitted. Concentration of users is low, but there is often evidence of other users. On-site interpretive facilities, low standard roads and trails, trailheads, and signing should stress the natural environment in their design and be the minimum necessary to achieve objectives.

The consumption of natural resources is allowed. In the review of plans of operations, utility corridors, rights-of-way, and other surface disturbing projects, effort is taken to reduce their

TABLE F-1

SETTING OPPORTUNITY

	Primitive	Semi-Primitive Non-Motorized	Semi-Primitive Motorized	Roaded Natural	Rural	Urban
Remoteness Criteria	At least 3 miles from all roads or railroads.	At least 1/2 mile from all roads or railroads.	Within 1/2 mile of primitive roads and at least 1/2 mile from better than primitive roads.	Within 1/2 mile of better than primitive roads or railroads.	No distance criteria	No distance criteria
Size Criteria	5000 acres*	2500 acres*	2500 acres**	No size criteria.	No size criteria.	No size criteria.
Evidence of Human Use	Unmodified natural environment; surface disturbance rare and small; trails OK--no roads; structures small and rare.	Setting may have subtle modifications; surface disturbance limited and small; little or no evidence of primitive roads or motorized use; small isolated structures may be present.	Setting may have subtle modifications; surface disturbance limited and small; primitive roads and motorized use is present; small isolated structures may be present.	Moderate evidence of human modification harmonious with landscape; surface modification common; roads and highways present; structures scattered and visually subordinate; recreation facilities small and rustic.	Setting substantially modified; surface modifications typical; roads and highways present; cultivated lands common; structures readily apparent, small dominant clusters, developed recreation facilities.	Natural setting. subordinate to cultural modified landscape; surface modification extensive; roads, highways, parking areas for intensive use; structures and complexes dominant--towns, industry, resorts, etc.
Social Setting	Less than 6 parties encountered on trail per day; less than 3 parties visible at campsite; little evidence of previous recreation use.	6-10 parties encountered on trail per day; less than 6 parties visible at campsite; limited evidence of previous recreation use.	Low to moderate frequency of contact.	Frequency of contact is moderate in developed sites and on roads; low to moderate elsewhere.	Frequency of contact is moderate to high in developed sites and on roads and trails; moderate elsewhere.	Large numbers of users on-site and in nearby areas.
Managerial Setting	No on-site controls--only off-site; on site facilities resource protection only; no facilities for user convenience or safety.	Off-site controls preferred--on-site controls subtle; facilities are avoided but may be provided for resource protection or user safety.	On-site controls present but subtle; facilities for resource protection and user safety; law enforcement occasionally visible.	On-site controls noticeable but harmonious with natural environment; rustic facilities for user convenience and resource protection; law enforcement occasionally visible.	On-site controls obvious and numerous; facilities widely available for user convenience, safety, special activities, and resource protection. Law enforcement moderately visible.	On-site controls numerous; facilities for intensive use and special activities provided; law enforcement highly visible.

* May be smaller if adjacent to semi-primitive non-motorized class.
** May be smaller if adjacent to primitive class.

impacts on the natural environment. Recreational activities occurring in this zone include car camping, ORV touring, backpacking, hiking, horseback riding, nature study, and viewing scenery.

Frequency of managerial contact with visitors is low to moderate on trails and primitive roads.

Roaded Natural

Roaded natural areas are managed to provide a naturally-appearing environment with moderate evidences of the sights and sounds of man. Motorized use is permitted. Concentration of users is moderate with evidence of other users prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment. Development of facilities for motorized use is provided for in any proposed construction standards and design of facilities.

Placement of rights-of-way, utility corridors, management facilities, and other surface disturbing activities would be favored in this zone over placement in primitive or semi-primitive non-motorized zones when applicable. The consumption of natural resources is allowed except at any proposed or developed trailheads, developed recreation areas, and geological features interpreted as major themes. Recreational activities occurring in this zone include organized camping (developed recreational facilities), ORV touring, picnicking, trailer camping, rockhounding, nature study, and viewing of historical and prehistoric resources. Staging areas for backcountry use and for interpretation of geological features occur in this zone.

Frequency of managerial contact with visitors is moderate to high.

APPENDIX G

APPENDIX G

SPECIES KNOWN OR LIKELY TO OCCUR IN EL MALPAIS NATIONAL CONSERVATION AREA

Common Name	Scientific Name	BLU	Habitat
MAMMALS			
Bats			
little brown myotis	*Myotis lucifugus*	All	permanent water
long-eared myotis	*M. evotis*	GHIJK	ponderosa
fringed myotis	*M. thysanodes*	K	ponderosa grass
long-legged myotis	*M. volans*	K	ponderosa grass
small-footed myotis	*M.leibii*	HJ	ponderosa spruce/fir
silver-haired bat	*Lasionycteris noctivagans*	All	migratory
western pipistrelle	*Pipistrellus hesperus*	AI	cliffs/ grassland
big brown bat	*Eptesicus fuscus*	CDGHIJ	ponderosa p/j
hoary bat	*Lasiurus cinereus*	HIJ	woodland
Townsend's big-eared bat	*Plecotus townsendii*	J	hibernation
pallid bat	*Antrozous pallidus*	AI	grass/rocky
Mexican free-tailed bat	*Tadarida brasiliensis*	AC	grass/pinon juniper
Cottontails			
cottontail	*Silvilagus auduboni*	AC	grass/pinon juniper

montane cottontail	*S. floridanus*	HK	ponderosa higher elevations
Jackrabbits			
black-tailed jackrabbit	*Lepus californicus*	A	grass shrub
Rodents			
cliff chipmunk	*Eutamias dorsalis*	CDGH	ponderosa p/j
Colorado chipmunk	*E. quadrivattatus*	CHJ	ponderosa rocky
rock squirrel	*Spermophilus variegatus*	IJ	broken terrain
Gunnison's prairie dog	*Cynomys gunnisoni*	A	grass meadows
Abert's squirrel	*Sciurus aberti*	GHIJ	mixed conifer
red squirrel	*Tamiasciurus hudsonicus*	HJ	mixed conifer spruce/fir
Botta's pocket gopher	*Thomomys bottae*	ABC	suitable soils
silky pocket mouse	*Perognathus flavus*	AC	grass open p/j
plains pocket mouse	*P. flavescens*	AB	sandy grassland
Ord's kangaroo rat	*Dipodomys ordii*	C	suitable soils
Banner-tailed Kangaroo Rat	*D.spectabilis*	A	grassland
W. harvest mouse	*Reithrodontomys megalotis*	All	all habitats
deer mouse	*Peromyscus maniculatu*	CDH	ponderosa shrub
brush mouse	*P. boylii*	ACD	shrub, rocky soils

pinon mouse	P. truei	CIJ	p/j woodland
rock mouse	P. difficilis	CIJ	p/j oak-rubble
N. grasshopper mouse	Onychomys leucogaster	AB	sandy grassland
white-throated woodrat	Neotoma albigula	All	all habitats
S. plains woodrat	N. micropus	IJ	rocky foothill
Stephen's woodrat	N. stephensi	CIJ	rock-pinon juniper
Mexican woodrat	N. mexicana	GHIJ	mixed conifer
meadow vole	Microtus pennsylvanicus	BE	grass-sedge, water
porcupine	Erithizon dorsatum	GHIJ	woodland
Carnivores			
coyote	Canis latrans	ABC	all grasslands
grey fox	Urocyon cinereoargenteus	CIJ	broken country, low woodland
black bear	Ursus americanus	HIJK	forests
ringtail	Bassaricus astutus	AIJ	cliffs, grasslands
badger	Taxidea taxus	AC	grasslands
striped skunk	Mephitis mephitis	All	
mountain lion	Felis concolor	IJ	broken terrain
bobcat	Lynx rufus	All	all habitats

Artiodactyls			
elk	*Cervus elaphus*	IK	montane grass
mule deer	*Odocoileus hemionus*	All	open terrain shrub
pronghorn	*Antilocarpa americana*	A	open grassland
BIRDS			
Herons & Bitterns			
great blue heron	*Ardea herodias*	BI	riparian, summer
cattle egret	*Bubulcus ibis*	E	riparian, occasional
snowy egret	*Leucophoyx thula*	E	riparian, occasional
black-crowned night heron	*Nycticorax nycticorax*	E	riparian, summer
white faced ibis	*Plegadis chihi*	E	riparian, migrant
Geese & ducks			
mallard	*Anas platyrhynchos*	ABE	riparian, summer
gadwall	*A. strepera*	AE	riparian, migrant
pintail	*A. acuta*	AE	riparian, migrant
green-winged teal	*A. carolinensis*	AE	riparian, summer (uncommon)
blue-winged teal	*A. discors*	AE	riparian, summer (uncommon)
cinnamon teal	*A. cyanoptera*	AE	riparian, migrant (occasional)

American widgeon	Mareca americana	AE	riparian, migrant (uncommon)
shoveler	Spatula clypeata	AE	riparian, migrant (uncommon)
common goldeneye	Bucephala clangula	AE	riparian, migrant (rare)
bufflehead	B. albeola	AE	riparian, migrant occasional)
ruddy duck	Oxyura jamaicansis	AE	riparian, migrant occasional)
canvasback	Athya valisineria	AE	riparian, migrant (uncommon)
Vultures, Eagles & Hawks			
turkey vulture	Cathartes aura	All	all habitats
sharp-shinned hawk	Accipeter striatus	GHIJ	woodland
Cooper's hawk	A. cooperii	IJ	canyons, broken terrain
Swainson's hawk	Buteo swainsoni	AC	rangeland
red-tailed hawk	B. jamaicensis	All	all habitats
ferruginous hawk	B. regalis	AC	winter (migrant)
marsh hawk	Circus cyaneus	AE	marsh, rangeland
golden eagle	Aquila chryseatos	AIJ	open canyons, plains
bald eagle	Haliaeetus leucocephalus	All	winter migrant

			(rare)
prairie falcon	*Falco mexicanus*	AIJ	open canyons, plains
peregrine falcon	*F. peregrinus*	AIJ	occasional migrant
merlin	*F. columbarius*	GHIJK	open woodland
sparrow hawk	*F. sparvarius*	AB	open country
Grouse, Turkey & Quail			
scaled quail	*Callipepla squamata*	A	shrub grass prairie
wild turkey	*Meleagris gallopavo*	CDHIJ	broken woodland
Rails & Coots			
sora rail	*Porzana carolina*	BE	wet meadows
Virginia rail	*Rallus limicola*	E	marshes
American coot	*Fulica americana*	AE	riparian
Plover, Sandpipers, & Allies			
killdeer	*Charadrius vociferus*	AE	fields, riparian
mountain plover	*Eupoda montana*	A	semiarid grassland
solitary sandpiper	*Tringa solitaria*	A	playas
spotted sandpiper	*Actitis macularia*	AE	migrant
least sandpiper	*Erolia minulata*	E	grassy marsh
American avocet	*Recurvirostra americana*	AE	playas, marshes
Wilson's phalarope	*Steganopus tricolor*	AE	playas, marshes

Pigeons & Doves

band-tailed pigeon	Columba fasciata	HIJK	mountain woodland
rock dove	C. livia	IJ	cliffs, farms
mourning dove	Zenaidura macroura	ACD	open woods, plains

Cuckoos & Roadrunners

roadrunner	Geococcyx californicus	AB	open country

Owls

barn owl	Tyto alba	IJ	woodlands, cliffs
screech owl	Otus asio	IJ	woodlands, canyons
flammulated owl	O. flammeolus	GHK	open pine forest
great horned owl	Bubo virginianus	All	all habitats
pygmy owl	Glaucidium gnoma	HIJK	open mixed conifer
burrowing owl	Speotyto cunicularia	A	open country
long-eared owl	Asio otus	GHIJK	woodlands
saw-whet owl	Aegolius acadicus	GH	conifer forests

Goatsuckers

whip-poor-will	Caprimulgus vociferus	IJK	pine-oak canyons
poor-will	Phalaenoptilus nuttallii	C	open shrub p/j
common nighthawk	Chordeiles minor	A	migrant, open land

Swifts & Hummingbirds			
white-throated swift	Auronautes saxatalis	HIJK	dry mountain
black-chinned hummingbird	Archilochus alexandri	IJ	wooded canyons
broad-tailed hummingbird	Selasphorus platycercus	AK	high meadows
rufous hummingbird	S. rufus	IJ	mountain meadows
Kingfishers			
belted kingfisher	Megaceryle alcyon	AC	ponds, migratory
Woodpeckers			
northern flicker	Colaptes cafer	CD	semiopen country
acorn woodpecker	Melanerpes formicivorus	IJ	oak-pine canyons
Lewis' woodpecker	Asyndesmus lewis	GHIJK	open forests
yellow-bellied sapsucker	Sphyrapicus varius	GHIJ	winter migrant
Williamson's sapsucker	S. thyroideus	GHIJ	winter migrant
downy woodpecker	Dendrocopos pubescens	GHIJ	woodland
ladder-backed woodpecker	D. scalaris	IJ	shrubby canyons
Passerines			
western kingbird	Tyrannus verticalis	A	open country
Cassin's kingbird	T. vociferans	HIJ	pine-oak mountains
ash-throated flycatcher	Myiarchus cinerascens	C	open woodland
Say's phoebe	Sayornis saya	AB	brushy

			plains, canyon mouths
Hammond's flycatcher	Empidonax hammondii	GHIJ	conifer forest
dusky flycatcher	E. oberholseri	GHIJ	open conifer forest
gray flycatcher	E.wrightii	C	p/j shrub
western wood pewee	Contopus sordidulus	GHIJ	open mixed conifer
horned lark	Eremophila alpestris	AB	sparse prairie
tree swallow	Iridoprocne bicolor	E	marshes
bank swallow	Riparia riparia	B	banks near streams, marshes
barn swallow	Hirundo rustica	CD	open shrub conifer
cliff swallow	Petrochelidon pyrrhonta	GHIJK	open wood-land
violet-green swallow	Tachycineta thalassina	GHIJK	open wood-land
Steller's jay	Cyanocitta stelleri	GHIJ	conifer woodland
scrub jay	Aphelocoma coerulescens	C	shrub pinon juniper
pinon jay	Gymnorhinus cyanocephala	CH	pinon juniper woodland
common raven	Corvus corax	All	all habitats
common crow	C. brachyrhynchos	GHIJ	woodland
Clark's nutcracker	Nucifraga columbiana	GHIJ	conifer forest
mountain chickadee	Parus gambeli	GHIJ	forest

plain titmouse	P. inornatus	C	p\j shrub
bushtit	Psaltriparus minimus	C	pinon-juniper shrub
white-breasted nuthatch	Sitta carolinensis	GHIJ	mixed wood-lands
red-breasted nuthatch	S. canadensis	GHIJ	conifer forest
pygmy nuthatch	S. pygmaea	GH	ponderosa Douglas fir forest
brown creeper	Certhia familiaris	GHIJK	mature forest
house wren	Troglodytes aedon	CD	shrub open woods
Bewick's wren	Thryomanes bewickii	C	p/j shrub
marsh wren	Telmatodytes palustris	E	marshes
canyon wren	Catherpes mexicanus	IJ	cliffs, canyons
rock wren	Salpinctes obsoletus	All	all habitats
mockingbird	Mimus polyglottos	A	open grass shrub
catbird	Dumatella carolinensis	CD	undergrowth brush
Bendire's thrasher	Toxostoma bendirei	AB	open desert farmland
sage thrasher	Oreoscoptes montanus	IJ	brushy slopes
robin	Turdus migratorius	GHIJK	open forest
hermit thrush	Hylocichla guttata	GHIJ	mixed conifer woodland
western bluebird	Sialia mexicana	CD	shrub, open

			mixed conifer
mountain bluebird	S. currucoides	AB	open terrain
Townsend's solitaire	Myadestes townsendi	CDH	mixed conifer, open p/j
blue-gray gnatcatcher	Polioptila caerulea	C	p/j shrub
ruby-crowned kinglet	Regulus calendula	GHIJ	mixed conifer
loggerhead shrike	Lanius ludovicianus	AB	open country
starling	Sturnus vulgaris	AB	open country
solitary vireo	Vireo solitarius	GHIJK	open pine oak woods
warbling vireo	V. gilvus	K	aspen groves
orange-crowned warbler	Vermivora celata	CD	migrant, shrub conifer
Virginia's warbler	V. virginiae	CIJ	oak canyons shrub p/j
yellow-rumped warbler	Dendroica audoboni	GHIJK	open conifer
black-throated gray warbler	D. nigriscens	CIJ	oak-p/j slopes
Townsend's warbler	D. townsendi	GHIJ	migrant, conifer forest
Grace's warbler	D. gracei	GHIJK	pine oak forest, mountains
MacGillivray's warbler	Oprornis tolmiei	GHIJ	migrant, forest
yellowthroat	Geothlypis trichas	E	marshes

western meadowlark	Sturnella neglecta	A	plains, meadows
yellow-headed blackbird	Xanthocephalus xanthocephalus	E	migrant, marshes
red-winged blackbird	Agelaius phoeniceus	EB	marshes
Brewer's blackbird	Euphagus cyanocephalus	A	open country
brown-headed cowbird	Molothrus ater	A	open country
Scott's oriole	Icterus parisorum	C	p/j shrub
northern oriole	I. spp.	K	open oak woods
western tanager	Piranga ludoviciana	GHIJK	open conifer
hepatic tanager	P. flava	K	open mountain forest, oak pine
black-headed grosbeak	Pheucticus melanocephalus	GHIJK	open mixed conifer
indigo bunting	Passerina cyanea	AC	shrublands
lazuli bunting	P. amoena	A	migrant
Cassin's finch	Carpodicus cassinii	GHIJK	winter, open mixed conifer
house finch	C. mexicanus	CIJ	scrub canyons/ shrub conifer
lesser goldfinch	Spinus psaltria	CD	migrant, shrub conifer
pine siskin	S. pinus	GHIJ	mixed conifer
red crossbill	Loxia curvirostra	GHIJ	winter, mixed conifer

			forest
green-tailed towhee	Chlorura chlorura	CD	open shrub conifer slopes
rufous-sided towhee	Pipilo erythrophthalmus	GHIJK	forest edges
brown towhee	P. fuscus	IJ	open p/j canyons
savannah sparrow	Passerculus sandwichensis	A	migrant, prairie
vesper sparrow	Poocetes gramineus	A	open grass shrub
rufous-crowned sparrow	Aimophila ruficeps	A	grassy rocky slopes
Cassin's sparrow	A. cassinii	A	arid grassy country
black-throated sparrow	Amphispiza bilineata	AIJ	arid brush slopes
sage sparrow	A. belii	A	sagebrush plains
dark-eyed junco	Junco spp.	GHIJ	mixed conifer
chipping sparrow	Spizella passerina	GHIJ	open woodland
Brewer's sparrow	S. breweri	A	big sage/ rabbitbrush
white-crowned sparrow	Zonotrichia leucphrys	ACD	migrant
song sparrow	Melospiza melodia	CDGH	migrant
AMPHIBIANS			
tiger salamander	Ambystoma tigrinum	ABEIJ	playas, ponds
Western spadefoot	Scaphiopus hammondi	ABE	playas, ponds
red-spotted toad	Bufo punctatus	ABIJ	rocky areas

Woodhouse's toad	B. woodhousei	BE	sandy areas
Great Plains toad	B. cognatus	A	grasslands
leopard frog	Rana pipiens	ABEIJ	ponds, permanent water
REPTILES			
lesser earless lizard	Holbrookia maculata	AB	sandy washes
collared lizard	Crotophytus collaris	ABF	rocky areas
leopard lizard	C. wislizini	AB	sparse vegetation
eastern fence lizard	Sceloporus undulatus	All	all habitats
short-horned lizard	Phrynosoma douglassi	All	fine loose sand
tree lizard	Uta ornata	GHIJK	trees
side blotched lizard	U. stansburiana	ABCD IJ	
Great Plains skink	Eumeces obsoletus	ACDIJ	shrub
many lined skink	E. multivirgatus	All	near water
Chihuahua whiptail	Cnemidophorus exsanguis	IJ	canyon bottoms, oak
racer	Coluber constrictor	BCIJ	sandstone outcrops
night snake	Hypsiglena torquata	All	rocky areas
desert striped whipsnake	Mastocophis taeniatus	CHIJ	open pinon juniper
gopher snake	Pituophis catenifer	All	
black-necked garter snake	Thamnophis cyrtopsis	IJ	rocky, water
western garter snake	T. elegans	ABEIJ	water

APPENDIX H

APPENDIX H

SPECIAL STATUS SPECIES POTENTIALLY OCCURRING IN EL MALPAIS NATIONAL CONSERVATION AREA

Common Name	Scientific Name	Status
MAMMALS		
Black-footed ferret*	Mustela Nigripes	Federal/State Group I
Bighorn sheep	Ovis canadensis mexicana	State Group I
Spotted bat	Euderma maculatum	Candidate**
BIRDS		
Peregrine falcon*	Falco peregrinus	Federal/State Group I
American bald eagle*	Haliaeetus leucocephalus	Federal/State Group II
White-faced ibis	Plegadis chihi	Candidate**
Ferruginous hawk	Buteo regalis	Candidate**
Mountain plover	Eupoda montana	Candidate**
Southern spotted owl	Strix occidentalis	Candidate**

Notes: *Species for which inventories have been conducted in the NCA.

**Species being considered for placement on the endangered or threatened species list are known as candidate species or notice of review species. Although candidate species are not yet protected by the Endangered Species Act, BLM policy requires measures to protect their habitat.

APPENDIX I

APPENDIX I

RIO PUERCO RESOURCE AREA
ALLOTMENT CATEGORIZATION CRITERIA

Category M (Maintain)	Category I (Improve)	Category C (Custodial)
An allotment must meet conditions 1, 2, & 3 or 1, 2, & 4 (below):	An allotment must meet any one of the following 3 conditions:	An allotment must meet all of the following conditions:
1. Has no significant resource conflicts.	1. Has a potentially significant resource conflict.	1. Has no significant resource conflict.
AND	OR	AND
2. Has only a moderate potential for improvement in forage production.	2. Has a high potential for improvement in forage production and a range condition rating of 50 or less.	2. Has a low potential for improvement in forage production.
AND	OR	
3. Has a range condition rating of 38 to 51 and an improving range trend.	3. Has a range condition rating of 50 or less and a static or declining range trend.	OTHER CONSIDERATIONS Contains less than 30% public land or less than 1,540 acres public land.
OR		
4. Has a range condition of 51 or higher and a static or improving range trend.	OTHER CONSIDERATIONS Contains 30% or more public land or more than 1,540 acres public land.	
OTHER CONSIDERATIONS Contains 30% or more public land or more than 1,540 acres public land.		

NOTE: Any parcel of public land, regardless of size, with an identified significant resource conflict, will qualify for the "I" category.

APPENDIX J

APPENDIX J

LIMITS OF ACCEPTABLE CHANGE (LAC) MONITORING SYSTEM* --Indicators Monitor El Malpais NCA Conditions

WHY MONITOR

The designation of an area as a NCA does not ensure that desired conditions will be protected, or opportunities will exist for visitors to obtain a positive recreation or wilderness experience.

Desired NCA conditions include:

- * Air quality is maintained at a level that meets or exceeds federal and state standards.
- * Water quality is maintained at a level that protects aquatic ecosystems, and drinking water is free from human fecal contamination.
- * Wildlife and plant species exist in natural distributions and abundances.
- * Outstanding opportunities exist in wilderness areas for solitude, challenge, self-reliance, primitive and unconfined recreation, and scientific study.
- * Natural processes operate freely in wilderness areas.
- * The imprint of human activities is substantially unnoticeable in wilderness areas.
- * Outstanding opportunities for diverse recreational experiences exist within a natural setting.

Various uses will inevitably cause some change in NCA conditions. Recreation use, transportation and trail systems, livestock grazing, fire suppression, exotic species introduction, air pollution, crowding, littering, and excessive regulation all can threaten the very values the NCA was designated to conserve. Change is not necessarily bad. Some existing conditions need to change to become acceptable. Change should, however, be effectively observed and described.

THE ROLE OF INDICATORS

BLM managers will want to monitor how much change is occurring in El Malpais NCA conditions. They will need to look at the use of indicators, which are defined as specific elements of the NCA setting that change in response to human activities.

Indicators provide quantitative documentation on how much conditions have changed, serve as tools to examine trends and highlight problems, and can act as an early warning to predict future conditions. When compared with previously set standards describing acceptable limits of change, indicators can signal the need for corrective management action, evaluate the effectiveness of various management actions, and help determine if desired NCA conditions are being achieved.

STEPS IN A MONITORING PROGRAM

1. Describe the area's natural (or biological) and human characteristics (affected environment). Identify unique area attributes. Gather all available data.

2. Identify human activities that impact conditions. Identify issues and concerns.

3. Define goals and management objectives that reflect the desired NCA conditions.

4. Select indicators of environmental and experiential conditions.

5. Describe sampling and measurement methods for each indicator.

6. Specify standards for acceptable limits of change for each indicator.

7. Inventory indicator conditions and compare with standards.

8. Identify corrective management actions where conditions are below standards.

CRITERIA TO GUIDE INDICATOR SELECTION

Quantitative - Can the indicator be measured quantitatively?

Correlation - Does the indicator detect a change in conditions caused by human activities?

Feasible - Can the indicator be measured by field personnel using simple equipment and sampling techniques?

Reliable - Can the indicator be measured reliably (i.e., with training, will different observers collect the same information)?

Responsive - Does the indicator detect a change in conditions that is responsive to management control?

Sensitive - Can the indicator detect a change in conditions that occur within one year?

Integration - Does the indicator reflect the conditions of more than itself?

Early Warning Ability - Does the indicator act as an early warning, alerting managers to deteriorating conditions before unacceptable changes have occurred?

Significance - Does the indicator detect a change in conditions that persists for a long time (e.g., 5 years), disrupts ecosystem functioning, or reduces the future desirability of the area to visitors, researchers, grazing allottees, and other NCA users?

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* Reference: Krampe and Merigliano 1989.

APPENDIX K

PARTIAL CHECKLIST OF VEGETATION OF EL MALPAIS NCA

ANNOTATED CHECKLIST OF VASCULAR PLANTS

ADIANTACEAE

Cheilanthes eatonii Baker. Eaton's lip-fern. Sandstone, infrequent, north side of boulders. Evergreen rosette.

Cheilanthes feei T. Moore. Slender lip-fern. Lava, infrequent, shady crevasses and caves. Evergreen rosette. (Restricted to limestone in the Datil Mountains (Fletcher 1978)).

Cheilanthes fendleri Hook. Fendler's lipfern. Sandstone, infrequent, shaded slope. Evergreen rosette.

Pellaea atropurpurea (L.) Link. Purple cliffbrake. Lava, rare, shade, collapse-depressions. New record in Cibola County. Evergreen rosette.

AGAVACEAE

Yucca angustissima Engelm. ex Trel. Fineleaf yucca. Sandstone, infrequent. May-June, mature fruit September. Evergreen rosette.

Yucca baccata Torr. Banana yucca. Lava and sandstone, infrequent. June. Evergreen rosette.

ANACARDIACEAE

Rhus trilobata Nutt. var. trilobata. Skunkbush sumac. Lava and sandstone, common. April and May. Shrub.

ASPLENIACEAE

Asplenium septentrionale (L.) Hoffman. Grass fern. Lava, rare, ledges on sides of collapse-depressions and crevasses. Evergreen rosette.

Asplenium trichomanes L. Maidenhair spleenwort. Lava, rare, deep shade, caves in collapse-depressions. Evergreen rosette. These two Asplenium species are widespread in the western U.S., but very uncommon, and restricted to sheltered crevices of rock ledges and cliffs.

Woodsia plummerae Lemmon. Rockfern. Lava, common; sandstone, infrequent, shade. Subterranean perennial. Prefers igneous rocks throughout its range.

ASTERACEAE

Antennaria plantaginifolia var. ambigens (Greene) Cronq. (Antennaria obovata). Pussytoes. Sandstone, infrequent. June. Crown perennial.

Artemisia bigelovii Gray. Slender gray sagebrush. Sandstone, common. August-October. Subshrub.

Artemisia campestris subsp. pacifica (Nutt.) Hall & Clements. Western sagebrush. Sandstone, common. July-August. Crown perennial.

Artemisia carruthii Wood ex Carruthers. Flat sagebrush. Lava, common. July-September. Crown perennial.

Artemisia filifolia Torr. Sand sagebrush. Sandstone, infrequent. September. Shrub.

Artemisia frigida Willd. Fringed sagebrush. Sandstone, common. June-August. Subshrub.

Artemisia ludoviciana subsp. albula (Woot.) Keck. Mexican sagebrush. Sandstone, common. August-September. Crown perennial.

Bahia dissecta (Gray) Britt. Ragleaf bahia. Lava, infrequent; sandstone, infrequent. August-September. Summer annual.

Brickellia brachyphylla (Gray) Gray. Short-leaved brickelbush. Lava, infrequent; sandstone, common. August. Subshrub.

Brickellia californica (Torr.& Gray) Gray. California brickelbush. Lava, common. August-September. Shrub.

Brickellia grandiflora (Hook.) Nutt. var. grandiflora. Tasselflower brickelbush. Sandstone, infrequent. September. Subterranean perennial.

Chrysothamnus nauseosus subsp. albicaulis (Nutt.) Hall & Clements. Lava infrequent. August-September. Shrub. New record in Cibola County.

Chrysothamnus nauseosus subsp. bigelovii (Gray) Hall & Clements. Rubber rabbitbrush. Sandstone, infrequent. September. Shrub.

Cirsium neomexicanum Gray. Lavendar thistle. Sandstone, rare. June. Biennial.

Conyza canadensis (L.) Cronq. Horseweed. Lava, rare. August. Summer annual.

Erigeron divergens Torr. & Gray. Spreading fleabane. Sandstone, infrequent. June-August. Crown perennial.

Erigeron vetensis Rydb. Lava and sandstone, infrequent. May. Crown perennial. New record in Cibola County.

Eupatorium herbaceum (Gray) Greene. White thoroughwort. Lava and sandstone, common. August-September. Crown perennial.

Gutierrezia sarothrae (Pursh.) Britt. & Rusby. Broom snakeweed. Sandstone, common. August-October. Subshrub.

Heterotheca villosa (Pursh.) Shinners var. *villosa* (*Chrysopsis villosa*). Hairy golden aster. Lava, abundant; sandstone, common. May-October. Crown perennial. Most ubiquitous herb on the lava flow.

Hieracium fendleri Schultz-Bip. var. *fendleri*. Hawkweed. Sandstone, rare. August. Subterranean perennial.

Hymenopappus filifolius var. *cinereus* (Rydb.) I.M. Johnston. White ragweed. Sandstone, common. June-July. Crown perennial.

Hymenoxys argentea (Gray) Parker. Silver sunflower. Sandstone, abundant. May-August. Crown perennial. Range is limited to New Mexico and eastern Arizona.

Hymenoxys richardsonii var. *floribunda* (Gray) Parker. Colorado rubberweed. Sandstone, common. June-July. Crown perennial.

Leucelene ericoides (Torr.) Greene. White aster. Lava and sandstone, infrequent. May. Subterranean perennial.

Machaeranthera linearis Greene. Sandstone, infrequent. September-October. Crown perennial.

Machaeranthera pinnatifida (Hook.) Shinners var. *pinnatifida* (*Haplopappus spinulosus* (Pursh.) DC. subsp. *spinulosus*). Spiny goldenweed. Sandstone infrequent. June-July. Crown perennial.

Machaeranthera tanacetifolia (H.B.K.) Nees. Tahoka daisy. Sandstone, rare. September. Summer annual.

Pericome caudata Gray var. *caudata*. Tailleaf pericome. Lava, common, collapse-depressions. August-September. Crown perennial.

Psilostrophe sparsiflora (Gray) A. Nels. Greenstem paperflower. Sandstone, infrequent. July-August. Crown perennial.

Senecio *douglasii* var. *longilobus* (Benth.) L. Benson. Threadleaf groundsel. Lava, infrequent. June-August. Evergreen subshrub.

Senecio *multicapitatus* Greenm. Groundsel. Sandstone, infrequent. September. Crown perennial.

Senecio *multilobatus* Torr. & Gray ex Gray. Lobeleaf groundsel. Sandstone, infrequent. May-June. Crown perennial.

Senecio *riddellii* Torr. & Gray. Sandstone, infrequent. June-August. Subshrub.

Solidago *wrightii* var. *adenophora* Blake. Wright's goldenrod. Sandstone, infrequent, shade below cliffs. August-September. Crown perennial.

Sonchus *oleraceus* L. Common sow-thistle. Lava, rare. July. Summer annual.

Tetradymia *canescens* DC. Spineless horsebrush. Sandstone, infrequent. July-September. Shrub.

Townsendia *leptotes* (Gray) Osterhout. Slender daisy. Lava, infrequent; sandstone, common. May-August. Crown perennial. New record in Cibola County.

Viguiera *annua* (M.E. Jones) Blake. Annual goldeneye. Lava, infrequent. August. Summer annual. New record in Cibola County.

BORAGINACEAE

Cryptantha *flava* (A. Nels.) Payson. Yellow hiddenflower. Sandstone, infrequent. April. Crown perennial.

Cryptantha *jamesii* var. *multicaulis* (Torr.) Payson. James' hiddenflower. Sandstone, common. April-July. Crown perennial.

Lappula *redowskii* (Hornem.) Greene var. *redowskii*. Stickseed. Lava, common. May. Winter annual.

Lithospermum *incisum* Lehm. Puccoon. Sandstone, rare, April-May. Subterranean perennial.

BRASSICACEAE

Arabis *fendleri* (S. Wats.) Greene var. *fendleri*. Fendler rockcress. Lava, common; sandstone, infrequent. April-May. Crown perennial.

Descurainia richardsonii subsp. incisa (Engelm.) Detling. Richardson's tansy mustard. Lava, rare. July. Summer annual.

Dimorphocarpa wislizenii (Engelm.) Rollins (Dithyrea wislizenii). Spectacle pod. Sandstone, common. July-September. Summer annual.

Erysimum capitatum (Dougl.) Greene. Western wallflower. Sandstone, infrequent. June. Crown perennial.

Lesquerella fendleri (Gray) S. Wats. Fendler's bladderpod. Sandstone, common. May. Crown perennial.

Lesquerella intermedia (S. Wats.) Heller. Sandstone, abundant. April-July. Crown perennial. New in Cibola County.

Thelypodiopsis linearifolia (Gray) Al-Shehbaz (Sisymbrium linearifolium). Narrow-leaf mustard. Sandstone, common. June-August. Crown perennial.

Thelypodium wrightii Gray. Lava, infrequent, crevices. July-August. Biennial.

Thlaspi montanum var. fendleri (Gray) P. Holmgren (Thlaspi alpestre). Wild candytuft. Sandstone, common. March-April, fruit March-May. Crown perennial.

CACTACEAE

Coryphantha vivipara var. arizonica (Engelm.) W.T. Marshall. Pincushion cactus. Lava and sandstone, rare. June. Evergreen stem succulent.

Echinocereus fendleri Engelm. var. fendleri. Fendler's hedgehog cactus. Sandstone, rare. June. Evergreen stem succulent.

Echinocereus triglochidiatus var. melanacanthus (Engelm.) L. Benson. Lava, abundant; sandstone, infrequent. April-June. Evergreen stem succulent. Prefers rocky slopes, canyons, and igneous soil throughout its range. This population includes characteristics of var. neomexicanus, having longer stems and smaller clumps. It may be a hybrid, or the smaller clumps may be a result of growing conditions.

Echinocereus triglochidiatus Engelm. var. triglochidiatus. Claret-cup hedgehog. Sandstone, infrequent. June. Evergreen stem succulent.

Opuntia imbricata (Haworth) DeCandolle var. imbricata. Tree cholla. Lava and sandstone, infrequent. Evergreen stem succulent.

Opuntia phaeacantha Engelm. Berry pricklypear. Lava and sandstone, infrequent. June. Evergreen stem succulent.

Opuntia polyacantha Haworth. Central pricklypear. Lava, common; sandstone, infrequent. June. Evergreen stem succulent.

CAPRIFOLIACEAE

Symphoricarpos oreophilus var. utahensis (Rydb.). Utah snowberry. Sandstone, rare. Shrub.

CARYOPHYLLACEAE

Arenaria fendleri Gray var. fendleri. Fendler's sandwort. Sandstone, rare, damp pockets on rock. June-September. Crown perennial.

Arenaria lanuginosa var. longipedunculata Duncan (Arenaria confusa). Sandwort. Sandstone, rare. June. Crown perennial.

Silene laciniata Cav. Mexican campion. Sandstone, infrequent. July-September. Crown perennial.

CHENOPODIACEAE

Atriplex canescens (Pursh.) Nutt. Fourwing saltbush. Sandstone, infrequent. June-August. Shrub.

Ceratoides lanata (Pursh.) J.T. Howell (Eurotia lanata). Winterfat. Sandstone, rare. Subshrub.

Chenopodium albescens Small. Lava, rare. September. Summer annual.

Chenopodium leptophyllum (Moq.) Nutt. ex S. Wats. Slimleaf goosefoot. Lava, rare. July. Summer annual.

COMMELINACEAE

Commelina erecta L. var. angustifolia (Michx.) Fern. Erect dayflower. Sandstone, rare. September. Subterranean perennial.

Tradescantia occidentalis var. scopulorum (Rose) Anderson & Woodson. Western spiderwort. Sandstone, infrequent. July-August. Subterranean perennial.

CUPRESSACEAE

Juniperus monosperma (Engelm.) Sarg. One-seed juniper. Lava and sandstone, common. Evergreen tree.

Juniperus scopulorum Sarg. Rocky mountain juniper. Kipuka meadow only, very large. Evergreen tree.

CYPERACEAE

Carex eleocharis Bailey. Kipuka meadow only. May. Subterranean perennial.

Carex occidentalis Bailey. Rocky mountain sedge. Lava, rare, crevices; sandstone, rare, shade. May. Subterranean perennial.

Cyperus fendlerianus Boeckl. var. fendlerianus. Fendler's flat-sedge. Sandstone, rare, deep sand. Mature achenes September. Subterranean perennial.

Cyperus schweinitzii Torr. Sandstone, rare, deep sand. July, mature achenes September. Subterranean perennial. New record in Cibola County.

ERICACEAE

Pterospera andromedea Nutt. Pinedrops. Sandstone, rare, shade. Subterranean perennial (saprophyte).

EUPHORBIACEAE

Chamaesyce chaetocalyx (Boiss.) Woot. & Standl. (Euphorbia fendleri var. chaetocalyx). Sandstone, infrequent. August. Crown perennial.

Chamaesyce serpyllifolia (Pers.) Small (Euphorbia serpyllifolia). Thymeleaf spurge. Lava, rare. August. Summer annual.

Euphorbia lurida Engelm. Sandstone, rare, deep sand. May. Subterranean perennial.

FABACEAE

Astragalus humistratus var. humivagans (Rydb.) Barneby. Enema weed. Sandstone, rare, deep sand. July. Crown perennial.

Dalea formosa Torr. Feather indigobush. Sandstone, rare, found on only one west-facing gravel slope. June. Shrub. New record in Cibola County.

Lotus X nummularius (M.E. Jones) Tides. Deervetch. Sandstone, rare. July. Crown perennial. New record in Cibola County.

Lupinus argenteus Pursh. var. argenteus. Silvery lupine. Sandstone, rare, deep sand. July. Crown perennial.

Vicia americana ssp. minor (Hook.) C.R. Gunn. American vetch. Sandstone, rare. June. Crown perennial.

FAGACEAE

Quercus gambelii Nutt. Gambel oak. Lava, infrequent; sandstone, common. Large shrubs and trees.

Quercus X pauciloba Rydb. (Quercus undulata). Wavyleaf oak. Sandstone, common. Large shrub.

GERANIACEAE

Geranium eremophilum Woot. & Standl. Purple geranium. Sandstone, infrequent. July-August. Crown perennial.

Geranium lentum Woot. & Standl. White geranium. Lava, infrequent; sandstone, rare. May-August. Crown perennial.

GROSSULARIACEAE

Ribes cereum Dougl. X inebrians Lindl. Wax currant. Lava, common, crevices; sandstone, rare. April-May, fruit May-July. Shrub.

HYDRANGEACEAE

Fendlera wrightii (Gray) Heller (Fendlera rupicola var. wrightii). Cliff fendlerbush. Sandstone, rare. May. Shrub.

HYDROPHYLLACEAE

Phacelia coerulea Greene. Blue scorpionweed. Lava, infrequent. May. Annual. New record in Cibola County.

JUNCACEAE

Juncus interior var. arizonicus (Wieg.) F.J. Herm. Inland rush. Sandstone, rare, pool on bedrock. Crown perennial. New record in Cibola County.

LAMIACEAE

Agastache pallidiflora subsp. neomexicana (Briq.) Lint & Epling. Pale horsemint. Lava, common, cracks. July-September. Crown perennial.

Hedeoma drummondii Benth. False pennyroyal. Lava, rare. July. Crown perennial.

Monarda punctata var. lasiodonta Gray. Beebalm. Sandstone, infrequent. July. Crown perennial.

LILIACEAE

Anthericum torreyi Baker. Craglily. Sandstone, rare. July. Crown perennial.

LINACEAE

Linum puberulum (Engelm.) Heller. Plains flax. Sandstone, common. June-August. Summer annual.

MALVACEAE

Sphaeralcea digitata (Greene) Rydb. ssp. digitata. Globemallow. Sandstone, infrequent. June-July. Crown perennial.

Sphaeralcea fendleri Gray ssp. fendleri. Fendler's globemallow. Lava, rare; sandstone, infrequent, shade. June-September. Crown perennial.

NYCTAGINACEAE

Mirabilis diffusa (Heller) C.F. Reed. Sandstone, rare. July.

Mirabilis linearis (Pursh.) Heimerl. Desert four-o'clock. Lava, rare. July. Subterranean perennial.

Mirabilis multiflora (Torr.) Gray. Silvestre four-o'clock. Sandstone, infrequent. June-August. Subterranean perennial.

Mirabilis oxybaphoides (Gray) Gray ex Torr. Umbrellawort. Lava, rare. August. Subterranean perennial.

OLEACEAE

Forestiera neomexicana Gray. New Mexico wild olive. Lava, common at higher elevations in crevices and collapse-depressions; sandstone, infrequent. April, fruit August. Small tree.

Fraxinus cuspidata Torr. Flowering ash. Lava, infrequent, crevices and collapse-depressions; sandstone, common at higher elevations. May-June, fruit July. Shrub.

Menodora scabra (Engelm.) Gray var. scabra. Rough cods. Sandstone, rare. July. Subshrub.

ONAGRACEAE

Oenothera caespitosa subsp. montana (Nutt.) Munz. Tufted evening primrose. Lava and sandstone, rare. June. Crown perennial.

Oenothera coronopifolia Torr. & Gray. Evening primrose. Sandstone, infrequent. June-July. Crown perennial.

OROBANCHACEAE

Orobanche ludoviciana ssp. multiflora (Nutt.) Collins ined. Spike broomrape. Sandstone, rare, deep sand, August. Parasitic subterranean perennial.

PINACEAE

Pinus edulis Engelm. Pinyon pine. Lava and sandstone, common. Evergreen tree.

Pinus ponderosa Lawson. Ponderosa pine. Lava and sandstone, infrequent to common. Evergreen tree. There is an unusual pygmy forest of stunted and gnarled trees on site #13.

POACEAE

Andropogon gerardii Vitman. Big bluestem. Sandstone, infrequent. July-September. Crown perennial.

Aristida fendleriana Steud. Fendler threeawn. Lava, infrequent; sandstone, common. June-August. Crown perennial.

Blepharoneuron tricholepis (Torr.) Nash. Pine dropseed. Lava, infrequent; sandstone, common. September. Crown perennial.

Bouteloua curtipendula (Michx.) Torr. Sideoats grama. Lava and sandstone, common. July-September. Crown perennial.

Bouteloua eriopoda (Torr.) Torr. Black grama. Lava, infrequent. July. Crown perennial.

Bouteloua gracilis (Willd. ex H.B.K.) Lag. ex Steud. Blue grama. Lava and sandstone, common. July-September. Crown perennial.

Bouteloua hirsuta Lag. Hairy grama. Lava, common. July-September. Crown perennial.

Bromus lanatipes (Shear) Rydb. Red brome. Lava, infrequent, in damp depressions. Crown perennial.

Enneapogon desvauxii Beauv. Spike pappusgrass. Lava, rare. September. Crown perennial.

Erioneuron pilosum (Buckl.) Nash (Tridens pilosus). Hairy tridens. Lava, infrequent. June. Crown perennial.

Festuca idahoensis Elmer. Idaho fescue. Sandstone, infrequent. June-July. Crown perennial.

Hilaria jamesii (Torr.) Benth. Galleta grass. Sandstone, rare. September. Crown perennial.

Hordeum jubatum L. Foxtail barley. Lava, infrequent. June. Crown perennial.

Koeleria cristata (L.) Pers. Junegrass. Sandstone, infrequent. July. Crown perennial.

Lycurus phleoides H.B.K. Wolftail. Lava and sandstone, infrequent. July. Crown perennial.

Muhlenbergia fragilis Swallen. Lava, common. August. Summer annual. New record in Cibola County, northern range extension.

Muhlenbergia montana (Nutt.) A.S.Hitchc. Mountain muhly. Sandstone, common. August-September. Crown perennial.

Muhlenbergia pauciflora Buckl. New Mexico Muhly. Sandstone, common. July-September. Subterranean perennial.

Muhlenbergia pungens Thurb. Sandhill muhly. Sandstone, infrequent. July-August. Subterranean perennial.

Oryzopsis hymenoides (Roemer & Schultes) Ricker. Indian ricegrass. Sandstone, infrequent. June. Crown perennial.

Oryzopsis micrantha (Trin. & Rupr.) Thurb. Littleseed ricegrass. Lava, infrequent. May-June. Crown perennial.
Panicum capillare L. Common witchgrass. Lava, infrequent. August. Summer annual.

Poa fendleriana (Steud.) Vasey. Muttongrass. Lava, infrequent; sandstone, common. April-July. Crown perennial.

Schizachyrium scoparium (Michx.) Nash var. scoparium (Andropogon scoparius). Little bluestem. Lava, common; sandstone, infrequent. July-August. Crown perennial.

Sitanion hystrix (Nutt.) J.G. Smith. Bottlebrush squirreltail. Lava and sandstone, infrequent. May-September. Crown perennial.

Stipa neomexicana (Thurb.) Scribn. New Mexico porcupine grass. Sandstone, infrequent. June. Crown perennial.

POLEMONIACEAE

Ipomopsis longiflora (Torr.) V. Grant. Pale trumpets. Sandstone, infrequent. August-September. Summer annual.

Ipomopsis multiflora (Nutt.) V. Grant. Woody dogretch. Sandstone, common, deep sand. July-September. Crown perennial.

POLYGONACEAE

Eriogonum alatum Torr. Winged buckwheat. Sandstone, infrequent, deep sand. July-September. Subterranean perennial.

Eriogonum annuum Nutt. Annual buckwheat. Sandstone rare. August. Summer annual.

Eriogonum hieracifolium Benth. Wild buckwheat. Sandstone rare. July. Crown perennial.

Eriogonum jamesii Benth. var. jamesii. Antelope-sage. Lava and sandstone, common. July-September. Crown perennial.

PRIMULACEAE

Androsace septentrionalis var. subulifera Gray. Northern fairy candelabra. Sandstone, infrequent. June-August.

Summer annual. New record in Cibola County.

RANUNCULACEAE

Clematis ligusticifolia Nutt. Western virgin's bower. Lava, rare, large collapse depressions. August. Subshrub vine.

Delphinium virescens Nutt. subsp. wootonii (Rydb.) Ewan. Plains larkspur. Sandstone, rare. June. Subterranean perennial. New record in Cibola County.

Thalictrum fendleri Engelm. ex Gray var. fendleri. Fendler's meadowrue. Sandstone, common, shade. June-July. Subterranean perennial.

ROSACEAE

Cercocarpus montanus var. argenteus (Rydb.) F.L. Martin. Silver-leaf mountain-mahogany. Sandstone, infrequent. May. Semi-evergreen shrub.

Cercocarpus montanus Raf. var. montanus. Alder-leaf mountain-mahogany. Lava, rare, crevices; sandstone, common. May-June. Semi-evergreen shrub.

Fallugia paradoxa (D. Don) Endl. Apache plume. Lava, abundant, all habitats including aa lava; very rare on sandstone. May-August. Semi-evergreen shrub.

Holodiscus dumosus (Nutt.) Heller. Rock spirea. Lava, infrequent, crevices. May-July. Shrub.

Potentilla pennsylvanica L. Pennsylvania cinquefoil. Lava, rare. May-June. Crown perennial.

Prunus virginiana var. melanocarpa (A. Nels.) Sarg. Western black chokecherry. Sandstone, rare, on only one site - possibly introduced. Small tree.

RUBIACEAE

Hedyotis rubra Cav. Gray. Bluets. Sandstone, rare. June. Crown perennial.

SAXIFRAGACEAE

Heuchera parvifolia Nutt. ex Torr. & Gray var. parvifolia. Alumroot. Sandstone, rare, damp pockets in rock. May-June. Crown perennial.

SCROPHULARIACEAE

Castilleja integra Gray. Wholeleaf paintbrush. Lava and sandstone, common. April-September. Crown perennial.

Penstemon barbatus subsp. *trichander* (Gray) Keck. Beardlip penstemon. Lava, rare, under *Pinus ponderosa*; sandstone, infrequent. June-July. Crown perennial.

Penstemon virgatus Gray. Wandbloom beardtongue. Sandstone, rare. July. Crown perennial.

Schistophragma intermedia (Gray) Pennell. Lava, rare. August. Summer annual. Northeast range extension.

SELAGINELLACEAE

Selaginella densa var. *scopulorum* (Maxon) R.Tryon. Spikemoss. Sandstone, infrequent, in shade of boulders on steep slopes. Evergreen rosette.

SOLANACEAE

Lycium pallidum Miers. Pale wolfberry. Sandstone, rare. May. Shrub.

ULMACEAE

Celtis reticulata Torr. Netleaf hackberry. Sandstone, rare. May. Small tree.

VERBENACEAE

Glandularia wrightii (Gray) Umber (*Verbena wrightii*). Desert verbena. Lava, infrequent. May-July. Crown perennial.

VITACEAE

Parthenocissus inserta (Kerner) Fritsch. Virginia creeper. Lava, common at higher elevations, in deep crevices. June. Perennial vine.

DESCRIPTION OF ANNOTATIONS: VASCULAR PLANTS

The annotated checklist of vascular plants is arranged alphabetically by family, genus, and specific epithet. The format for each entry is as follows:

Binomial and Authority (Synonym where applicable). Common name. Substrate, relative abundance, specific habitat selection if any. Blooming season observed in this area. Life form. Further annotations.

In some cases, as with Fallugia, a taxon which is common on one substrate and very rare on the other is recorded for only the "preferred" substrate.

The relative abundance is a qualitative rating for the given substrate on a scale of rare-infrequent-common-abundant. Rare means there were very few individuals found on that substrate. A majority of the taxa were rated infrequent, meaning that they were found at widely scattered intervals.

Each taxon is assigned a life form classification as described by Fletcher (1978):

1) Trees, shrubs and subshrubs
2) Crown perennials - plants which develop perennating buds at or near ground level and die back to that level each year
3) Subterranean perennials - plants that sprout from underground buds in organs such as rhizomes, tubers, bulbs, and corms
4) Evergreen rosettes - plants with evergreen leaves at or near ground level, usually a basal rosette as in Yucca
5) Evergreen stem succulent - the Cactus family
6) Annuals, summer and winter

ANNOTATED CHECKLIST OF LICHENS

Acarospora chlorophana (Ach.) Mass. Lava and sandstone, common, north side of large stable rocks, not on stones. Areolate crustose, intense yellow-green.

Acarospora strigata (Nyl.) Jatta. Sandstone, infrequent, large and small stones in open. Areolate crustose, light blue.

Aspicilia alphoplaca (Ach.) Poelt & Leuckert (*Lecanora alphoplaca*). Sandstone, rare, shaded rocks under *Pinus ponderosa*. Crustose and lobate, tan with brown apothecia.

Aspicilia cf. *caesiocinerea*. Sandstone, rare. Areolate crustose, gray.

Aspicilia cf. *calcarea*. Lava, infrequent. Areolate crustose, gray.

Aspicilia cf. *cinerea*. Lava, infrequent. Areolate crustose, gray.

Buellia novomexicana B. de Lesd. Lava, rare. Areolate crustose, olive drab with brown apothecia, inconspicuous on lava.

Buellia retrovertens Tuck. Sandstone, rare. Areolate crustose, white with black apothecia.

Candelariella spraguei (Tuck.) Zahlbr. Lava and sandstone, infrequent, full sun. Areolate crustose, gold.

Catapyrenium lachneum (Ach.) R.Sant. (*Dermatocarpon hepaticum*). Terricolous on sand in sheltered pockets between rocks, infrequent. Squamulose, dark brown.

Cetraria coralligera (Weber) Hale. Lignicolous, rare, on shaded *Pinus edulis* stump. Adnate foliose, dark brown, dense isidia.

Cladonia cariosa (Ach.) Spreng. Terricolous, sand, infrequent. Fruticose, dark brown apothecia.

Cladonia chlorophaea (Florke ex Sommerf.) Sprengel. Terricolous, shaded soil over lava and sandstone, infrequent. Fruticose.

Cladonia pyxidata (L.) Hoffm. Terricolous, shaded soil over lava and sandstone, infrequent. Fruticose.

Collema polycarpon Hoffm. Lava, infrequent, ceiling of overhangs; sandstone, rare, niches in shaded cliffs.

Gelatinous.

Collema thamnodes Riddle (*Collema tuniforme*). Lava, rare, north-facing edge collapse-depression. Gelatinous.

Dermatocarpon miniatum (L.) Mann. Lava, infrequent, walls and ceilings of overhangs; sandstone, infrequent, north side of large boulders and cliffs. Umbilicate, light gray, bare below.

Dermatocarpon moulinsii (Mont.) Zahlbr. Lava, rare, walls and ceilings of overhangs; sandstone, rare, north side of large boulders and cliffs. Umbilicate, light gray, densely rhizinate.

Dimelaena oreina (Ach.) Norman (*Rinodina oreina*). Lava, rare; sandstone, infrequent. Crustose and lobate.

Diploschistes scruposus (Schreber) Norman. Lava and sandstone, infrequent, shade. Crustose, gray.

Flavoparmelia baltimorensis (Gyelnik & Foriss) Hale. Sandstone, rare, shade. Foliose.

Flavopunctelia flaventior (Stirt.) Hale (*Parmelia flaventior*). Lava, common, large stones in bottom of collapse-depressions and under shrubs; sandstone, infrequent, niches on north side of cliffs. Foliose.

Flavopunctelia soredica (Nyl.) Hale (*Parmelia ulophyllodes*). Corticolous, on *Pinus edulis* and *Cercocarpus*, infrequent. Foliose.

Heppia lutosa (Ach.) Nyl. Terricolous, shallow soil over sandstone, rare. Squamulose.

Heterodermia obscurata (Nyl.) Trevisan (*Anaptychia obscurata*). Sandstone, rare, with moss in shade. Adnate foliose, light gray.

Lasallia papulosa (Ach.) Llano. Sandstone, infrequent, north side of large boulders and cliffs. Umbilicate, light brownish-gray, pustulate.

Lasallia pennsylvanica (Hoffm.) Llano. Lava, rare, north-facing wall of crevice. Umbilicate. May be only a dark variant of *L. papulosa*.

Lecanora argopholis (Ach.) Ach. (*Lecanora frustulosa*). Sandstone, rare. Crustose, dark brown apothecia.

Lecanora caesiorubella Ach. Lignicolous, rare, on shaded *Pinus edulis* stump. Crustose, light gray with light gray apothecia.

Lecanora garovaglii (Koerb.) Zahlbr. Lava, rare. Foliose, olive green with gold apothecia. New record in New Mexico.

Lecanora nashii Ryan ined. Sandstone, rare. Areolate crustose, yellow green. Determined by B. Ryan. New record in New Mexico.

Lecanora novomexicana (B.de Lesd.) Zahlbr. (*Parmularia novomexicana*). Lava, infrequent; sandstone, abundant. Crustose and lobate.

Lecidea tesselata Floerke. Lava and sandstone, infrequent. Areolate crustose, light gray with black apothecia.

Lepraria cf. *incana*. Sandstone, rare. Crustose, light gray.

Leptogium denticulatum Tuck. Lava, rare, on ceiling of overhangs. Gelatinous.

Leptogium furfuraceum (Harm.) Sierk. Lava, rare, on ceiling of overhangs. Gelatinous.

Melanelia subolivacea (Nyl.in Hasse) Essl. (*Parmelia subolivacea*). Corticolous on *Pinus edulis*, infrequent. Foliose, dark brown.

Melanelia substygia (Rasanen) Essl. (*Parmelia saximontana*). Sandstone, common. Foliose, dark brown, uncommon esorediate form.

Neofuscelia ahtii (Essl.) Essl. (*Parmelia ahtii*). Lava, infrequent, usually on stones in bottom of collapse depressions. Adnate foliose, dark olive drab. Endemic to the arid Southwest; type locality: Natanes Plateau, Gila County, Arizona. New record in New Mexico.

Neofuscelia occidentalis (Essl.) Essl. (*Parmelia occidentalis*). Lava, infrequent, more sun tolerant than *N. ahtii*. Adnate foliose. Endemic to the arid Southwest; type locality: Chiricahua Mountains, Cochise County, Arizona. New record in New Mexico.

Parmelia sulcata Taylor. Sandstone, rare, shaded boulders at higher elevation. Foliose.

Parmotrema reticulatum (Taylor) M.Choisy (*Parmelia reticulata*). Sandstone, rare, on north-facing Dakota sandstone cliffs. Foliose, gray.

Peltigera rufescens (Weiss) Humb. (*Peltigera canina* var. *rufescens*). Sandstone, terricolous, infrequent, often under trees. Foliose, broad-lobed and veined beneath.

Phaeophyscia hispidula (Ach.) Essl. ssp. *limbata*. Sandstone, infrequent. Foliose, gray.

Physcia caesia (Hoffm.) Furnr. Lava, infrequent, shady overhangs; sandstone, rare. Adnate foliose, light gray.

Physcia dubia (Hoffm.) Lett. Lava, infrequent; sandstone, rare, shady side of boulders. Foliose.

Physcia mexicana B.de Lesd. Lignicolous, rare, on shaded *Pinus edulis* stump. Foliose.

Physconia detersa (Nyl.) Poelt (*Physcia detersa*). Sandstone, infrequent, on shaded cliffs with moss. Foliose.

Physconia muscigena (Ach.) Poelt (*Physcia muscigena*). Sandstone, infrequent, shaded rocks. Foliose.

Psora crenata (Taylor) Reinke. Sandstone, terricolous, infrequent. Squamulose.

Psora decipeins (Hedwig) Hoffman. Sandstone, terricolous, infrequent. Squamulose.

Psora icterica (Mont.) Mull.Arg. Sandstone, terricolous, rare. Squamulose.

Punctelia rudecta (Ach.) Krog (*Parmelia rudecta*). Sandstone, infrequent. Foliose.

Punctelia semansiana (Culb.& C.Culb.) Krog (*Parmelia semansiana*). Lava, rare, in shallow caves; sandstone, infrequent, on shaded cliffs. Foliose, gray.

Punctelia stictica (Duby) Krog (*Parmelia stictica*). Sandstone, infrequent, shade. Foliose.

Ramalina pollinaria (Westr.) Ach. Lava and sandstone, infrequent, shade. Fruticose, light green.

Rhizocarpon disporum (Naeg. ex Hepp) Mull.Arg. Lava and sandstone, infrequent. Areolate crustose.

Rhizoplaca chrysoleuca (Sm.) Zopf (*Lecanora chrysoleuca*). Lava, rare; sandstone, common. Umbilicate, green with orange apothecia.

Staurothele cf. *fuscocuprea*. Sandstone and pottery shards, infrequent. Crustose with minute lobes, black.

Toninia tristes (Th.Fr.) Th.Fr. Sandstone, infrequent. Areolate crustose.

Umbilicaria vellea (L.) Ach. Lava, infrequent, on ceiling of overhangs. Umbilicate.

Usnea subfloridana Stirton. Sandstone, on old stumps and on cliffs in shade, infrequent. Fruticose.

Xanthoparmelia chlorochroa (Tuck.) Hale. Lava, rare; sandstone, infrequent. Terricolous, foliose.

Xanthoparmelia conspersa (Ehrh.ex Ach.) Hale (Parmelia isidiata). Lava and sandstone, infrequent, on open pahoehoe and sandstone. Foliose.

Xanthoparmelia cumberlandia (Gyelnik) Hale. Lava, infrequent. Foliose.

Xanthoparmelia hypopsila (Mull.Arg.) Hale. Sandstone, infrequent, on shaded cliffs. Foliose.

Xanthoparmelia lineola (Berry) Hale. Lava and sandstone, most abundant foliose lichen on both substrates.

Xanthoparmelia mexicana (Gyelnik) Hale. Sandstone, infrequent. Foliose.

Xanthoparmelia novomexicana (Gyelnik) Hale. Lava, infrequent. Foliose.

Xanthoparmelia plittii (Gyelnik ex D.Dietr.) Hale. Lava, common. Foliose.

Xanthoparmelia taractica (Krempelh.) Hale. Sandstone, rare. Foliose.

Xanthoria elegans (Link) Th. Fr. (Caloplaca elegans). Lava, common, north side of pahoehoe ripples in open; sandstone, common. Adnate foliose, orange.

Xanthoria fallax (Hepp in Arnold) Arnold. Corticolous, infrequent, on shrubs. Foliose, orange.

Xanthoria polycarpa (Hoffman.) Reiber. Corticolous, infrequent, on shrubs. Foliose, orange.

DESCRIPTION OF ANNOTATIONS: LICHENS

The annotated checklist of lichens is arranged alphabetically by genus and specific epithet because the concepts of lichen classification are changing so rapidly that there is no standard current systematic arrangement. The format for each entry is as follows:

Binomial and Authority (Synonym where needed). Substrate, relative abundance, microhabitat. Growth form, annotations.

There are three substrate categories for the lichens:

1) Lava, including soil
2) Sandstone, including sand
3) Trees/bark, including dead stumps

The distinctions between terricolous (growing on soil), corticolous (growing on bark), and lignicolous (growing on old wood) lichens are mentioned in the checklist because habitat selection is important in identification. The species on the list are saxicolous (growing on rock) unless otherwise indicated.

Relative abundance is rated in the same manner as described for the flowering plants. Growth form is also important in identfying lichens. Each taxon is assigned a growth form classification:

1) Foliose and adnate-foliose: flattened and prostrate with an upper surface that is different from the lower, the adnate being more tightly attached
2) Fruticose: round to flattened branches with little difference between upper and lower surfaces, attached

only at the base

3) Crustose: very tightly attached, no lower cortex; areolate crustose appearing as little chinks on the rocks, crustose and lobate resembling the closely adnate foliose and having marginal lobes
4) Squamulose: thallus of small separate lobes lacking a lower cortex, usually growing on soil
5) Umbilicate: foliose in growth form but attached to substrate by a single cord, the edges free
6) Gelatinous: unstratified thallus, dark colored, becoming jellylike when wet.

Source: Francis and Williams 1988.

APPENDIX L

APPENDIX L

EXPLANATION OF TERMS USED TO DESCRIBE VISUAL ABSORPTION CAPABILITY*

Landscape Complexity

Landform Diversity - The greater the landform diversity, the greater the landscape complexity. Complex landforms can accept greater modification without visual degradation than can landscape with limited variety.

Low diversity = 1
Moderate diversity = 2
High diversity = 3

Vegetative Diversity - The greater the diversity of vegetative cover (including consideration of edge, spaces, and patterns), the greater the landscape complexity. Complex vegetation can accept greater modification without visual degradation than can landscapes with limited variety.

Low diversity = 1
Moderate diversity = 2
High diversity = 3

Rock and Soil Color Contrast - Lands with dark-colored soils and rocks generally have high visual absorptive capabilities. When disturbed, these soils and rocks have the least contrast with their vegetative mantle. The greater the contrast, the lower the visual absorption capability.

White-light yellow = 1
Intermediate tones = 2
Brown to black = 3

Slope - As slopes become steeper, visual changes become more obvious, thus decreasing the land's visual absorption capability.

70% + = 1
35 - 75% = 2
0 - 35% = 3

Vegetative Regeneration (Soil Productivity) - Lands that can revegetate rapidly have a higher visual absorption capability. Good vegetative regenerative potential acts to reduce the length of time of contrast produced by modification activities.

Low soil productivity = 1
Moderate soil productivity = 2
High soil productivity = 3

Vegetative Screening - Increased cover densities and increased cover heights, result in increased screening potential (decreased transparency. The increases visual absorption capabilities.

Vegetative Height	Vegetative Density
0 - 6 ft. = 1	0 - 20% = 1
6 - 75 ft. = 2	20% - 80% = 2
75 + ft. = 3	80% - 100% = 3

Visual Absorption Capability - The ability of the natural environment to withstand management manipulations without signicantly affecting its visual character.

Low ability to absorb visual change = 1
Moderate ability to absorb visual change = 2
High ability to absorb visual change = 3

Note: Terminology in this appendix describes the data in Table 1-6, Chapter 1.

GLOSSARY

GLOSSARY

allotment	An area of land designated and managed for grazing of livestock.
allotment management plan (AMP)	A documented program that applies to rangeland operations on public land, is prepared in consultation with the permittee(s) or lessee(s) involved, and (1) prescribes the manner in and extent to which livestock operations will be conducted to meet the multiple-use, sustained-yield, economic, and other needs and objectives as determined for public land through land use planning; (2) describes the type, location, ownership, and general specifications for the rangeland developments to be installed and maintained on public land to meet the livestock grazing and other objectives of land management; and (3) contains such other provisions relating to livestock grazing and other objectives as may be prescribed by the authorized officer consistent with applicable law.
animal unit month (AUM)	The amount of forage consumed by one mature cow (1,000 lb.) or its equivalent for one month.
cherry-stemmed road	A road that extends into a designated wilderness area but is not considered to be part of the wilderness; such a road may provide access to private land or water. Because the wilderness boundary is drawn to exclude the road, the boundary resembles a cherry stem.
Class II airshed	The purpose of the federal Prevention of Significant Deterioration (PSD) program is to ensure that areas having clean air maintain it. Thus, the PSD regulations apply in all areas designated as attainment throughout the state, which is the major portion of New Mexico. The regulations stipulate that air quality may deteriorate only small incremental amounts above any existing levels of pollution in such areas. Under the PSD program, all lands are divided into one of three classes. Class I areas have air that is pristine, such as in some national parks and wilderness areas, and almost no increase in air contaminant levels are allowed. Within New Mexico, eight wilderness areas and one national park are the only Mandatory Class I areas. The El Malpais NCA and National Monument are Class II areas. Class II areas allow moderate development, and Class III areas allow extensive growth. The classification scheme operates by allowing the siting of those new industries that will not violate the increments of pollution that are allowed for each class.
closed basin	A basin is considered closed with respect to surface flow if its topography prevents the occurrence of visible outflow. It is closed hydrologically if neither surface nor underground outflow can occur.
contiguous lands	As it pertains to wilderness, lands or legal subdivisions having a common boundary. Lands having only a common corner are not contiguous.
cultural resources inventories	Class I - A review of existing cultural resources data: (1) to provide a narrative overview of cultural resources by using existing information; and (2) to compile existing cultural resources site record data on which to base the development of the BLM's site record system.

	Class II - A sampling field inventory. This is designed to locate from surface and exposed profile indications all cultural resource sites within a portion of an area so that an estimate can be made of the cultural resources for the entire area. The Class II inventory is to be used where an intensive field inventory of the entire area (Class III) is not practical or necessary. Class III - An intensive field inventory. This is designed to locate from surface and exposed profile indications all cultural resource sites in an area. Upon its completion, normally no further cultural resource inventory work is needed. A Class III inventory is appropriate for small project areas, all areas to be disturbed and primary cultural resource areas.
earthen tank	Usually a permanent earthen structure for holding water temporarily. These are built in high rainfall runoff areas such as arroyos, canyons, or swales.
ecosystem	An ecological community considered together with the nonliving factors of its environment as a unit.
endangered species	Federally listed - Any species of animal or plant in danger of extinction throughout all or a significant portion of its range. State (Group I) - Species whose prospect of survival or recruitment in the state are in jeopardy in the foreseeable future. State (Group II) - Species whose prospect of survival or recruitment within the state may become jeopardized in the foreseeable future.
ephemeral water	A body of water (e.g., stream, pond) that flows or exists only in direct response to precipitation. Such flow or existence is usually of short duration.
fault	A fracture in the earth's crust accompanied by a displacement of one side with respect to the other.
fault scarp	The cliff formed by a fault. Most fault scarps have been modified by erosion since the faulting.
FLPMA	Federal Land Policy and Management Act of 1976, which mandated the BLM Wilderness Review. Often referred to and pronounced "FLIPMA".
grandfathered	Section 603(c) of FLPMA directs the BLM to manage lands under wilderness review "so as not to impair the suitability of such areas for preservation as wilderness..." However, Section 603(c) also provides a special exception to the "nonimpairment" criteria. Mining, grazing, and mineral leasing uses existing on the date of approval of FLPMA (October 21, 1976) may continue in the same manner and degree as on that date even if these uses impair wilderness values. Such uses are "grandfathered".
inholding	Private or state owned land inside the boundary of a wilderness study area but excluded from the wilderness study area.
initial inventory	The first step in the BLM wilderness review process. Inventory units or roadless areas that are obviously unsuitable for wilderness are separated from those that warrant intensive inventory for wilderness characteristics.
intensive inventory	The second major step in the BLM wilderness review process. Roadless areas are carefully inventoried for wilderness characteristics. The result of the intensive inventory is the identification of wilderness study areas.

intrusion	A feature (landform, vegetation, or structure) which is generally considered out of context because of excessive contrast and disharmony with characteristic landscape.
jacal	A construction technique that involves building a brush superstructure then plastering it with mud.
lithic	A stone or rock exhibiting modification by humans. It generally applies to projectile points, scrapers, and chips rather than ground stone.
magma	Naturally occurring mobile rock material, generated within the earth and capable of intrusion and extrusion, from which igneous rocks are thought to have been derived through solidification and related processes.
malpais	Rough country composed of dark basaltic lava.
minimum tool rule	Tools, equipment, or structures may be used for management when they are the minimum necessary for protection of the wilderness resource or when necessary in emergency situations for the health and safety of the visitor. The chosen tool, equipment, or structure should be the one that least degrades wilderness values temporarily or permanently.
petroglyph	A form of rock art manufactured by incising, scratching, or pecking designs into rock surfaces.
playa	The usually dry and nearly level lake plain that occupies the lowest parts of a closed depression.
public land	Any land and interest in land owned by the United States and administered by the Secretary of the Interior through the Bureau of Land Management, without regard to how the United States acquired ownership, except: lands located on the Outer Continental Shelf; lands held for the benefit of Indians, Aleuts, and Eskimos; and lands on which the United States retains the minerals, but whose surface is private.
range site	A distinctive kind of rangeland that differs from other kinds of rangeland in its ability to produce a characteristic natural plant community. A range site is capable of supporting a native plant community typified by an association of species that differs from that of other range sites in the kind of proportion of species or in total production.
rangeland development	Any facility or structure relating to rangelands that is designed to control patterns of use, provide water, and stabilize soil and water conditions.
raptor	Any predatory bird such as a falcon, hawk, eagle, or owl that has feet with sharp talons or claws adapted for seizing prey and a hooked beak for tearing flesh.
right-of-Way	An easement or permit that authorizes public land to be used for a specified purpose that generally requires a long narrow strip of land; examples are roads, powerlines, and pipelines.
riparian vegetation	Vegetation that occurs in or adjacent to essentially perennial drainage ways or their floodplains.

road	For the purposes of the BLM's wilderness inventory, the following definition has been adopted from the legislative history of FLPMA: "The word 'roadless' refers to the absence of roads that have been improved and maintained by mechanical means to ensure relatively regular and continuous use. A trail maintained solely by the passage of vehicles does not constitute a road." To clarify this definition, the following subdefinitions also apply: "Improved and maintained" - Actions taken physically by man to keep a road open to vehicular traffic. "Improved" does not necessarily mean formal construction. "Maintained" does not necessarily mean annual maintenance. "Mechanical means" - Use of hand or power machinery or tools. "Relatively regular and continuous use" - Vehicular use that has occurred and will continue to occur on a relatively regular basis. Examples are: access roads for equipment to maintain a stock water tank or other established water sources, access roads to maintained recreation sites or facilities, or access roads to mining claims.
roadless	Refers to the absence of roads that have been improved and maintained by mechanical means to ensure relatively regular and continuous use. A trail maintained solely by the passage of vehicles does not constitute a road.
roadless area	An area that is roadless, as defined above, and is bounded by a road, the edge of a right-of-way, other land ownership, or a significant imprint of humans.
sedimentary rocks	Rocks formed by the accumulation of sediment.
shear zone	A geologic zone in which shearing has occurred on a large scale so that the rock is crushed.
solitude	Outstanding opportunities for solitude or primitive and unconfined recreation are wilderness characteristics examined in the intensive wilderness inventory. Factors contributing to opportunities for solitude are vegetative screening, topographic relief, vistas, and physiographic variety.
steppe	Arid land usually characterized as being level and without forests; usually in large tracts and in regions of extreme temperature range and loess soil.
storage tank	A permanent water-holding structure used to supply water to troughs or pipelines.
supplemental values	Features of ecological, geological, or other scientific, educational, scenic, or historical value that may be present in a wilderness inventory unit. These are not necessary criteria for wilderness suitability, as is stated in the Wilderness Act of 1964, but must be assessed during the intensive wilderness inventory.
threatened species	Any species likely to become endangered within the foreseeable future throughout all or a significant part of its range.
vehicular way	A way is a two-wheel track maintained solely by the passage of vehicles and does not constitute a road or route. A route or road has been maintained or improved by mechanical means. Mechanical means has been defined by BLM as the use of hand or power machinery or tools.

visual resource management (VRM) classes	Class I - Natural ecological changes and very limited management activity are allowed. Any contrast created within the characteristic landscape must not attract attention. Class II - Changes in any of the basic elements (form, line, color, texture) caused by a management activity should not be evident in the landscape. A contrast may be seen but should not attract attention. Class III - Contrasts to the basic elements caused by a management activity may be evident and begin to attract attention in the landscape. The changes, however, should remain subordinate in the existing landscape. Class IV - Contrasts may attract attention and be a dominant feature in the landscape in terms of scale. However, the changes should repeat the basic elements of the landscape.
wilderness	The definition contained in Section 2(c) of the Wilderness Act of 1964 is as follows: "A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain." Wilderness is an area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation that is protected and managed so as to preserve its natural conditions and that (1) generally appears to have been affected primarily by the forces of nature, with the imprint of human work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features or scientific, educational, scenic, or historical value.
wilderness area	An area formally designated by Congress as part of the National Wilderness Preservation System.
wilderness characteristics	Those characteristics of wilderness as described in Section 2(c) of the Wilderness Act. These include size, naturalness, solitude, primitive and unconfined type of recreation, and supplemental values.
wilderness inventory	An evaluation of the public land in the form of a written description and a map showing those lands that meet the wilderness criteria as established under Section 603(a) of FLPMA and Section 2(c) of the Wilderness Act. The lands meeting the criteria will be referred to as Wilderness Study Areas (WSAs). Those lands identified as not meeting wilderness criteria will be released from further wilderness consideration.

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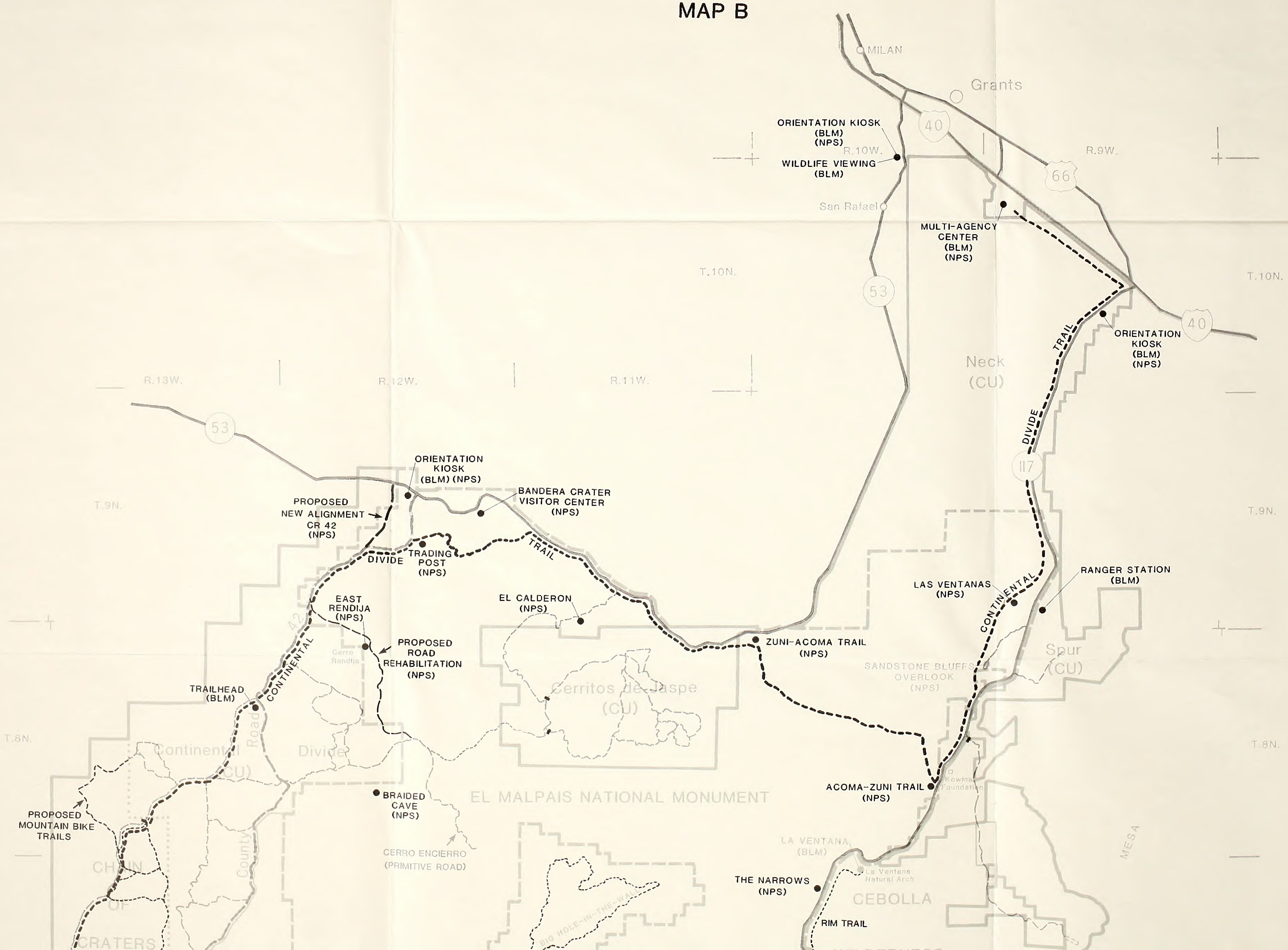

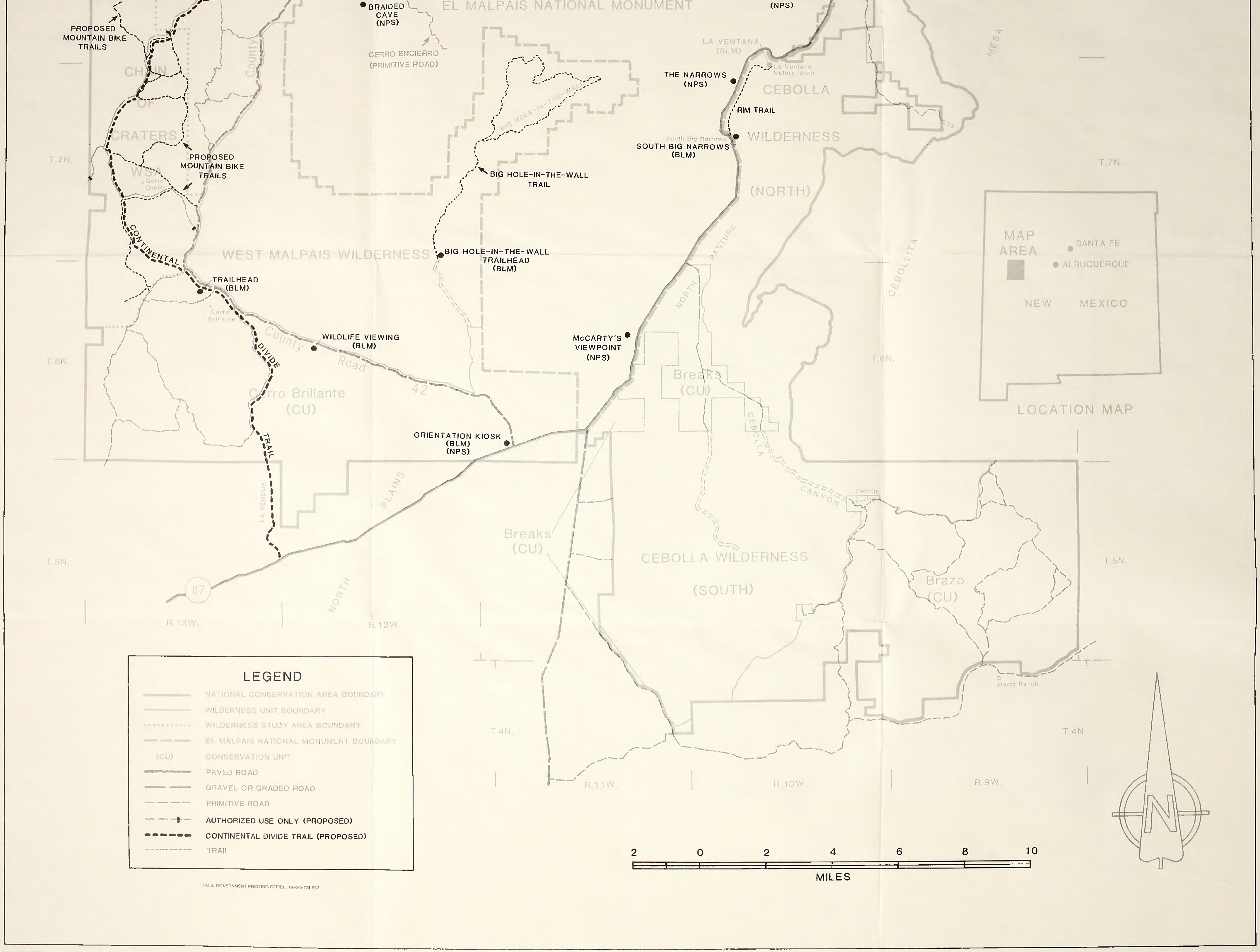

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